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ABSTRACT

In the third volume of this 10-volume report, 3 causal models of the school improvement process are presented and are used to identify outcomes of implementation and the factors influencing success. The first model predicts individual-level outcomes as a function of the magnitude of expected changes in instructional practice and the time spent on practice-related activities. The second model predicts school-level outcomes by projecting causal or predictive links between demographics, administrative context, practice-specific assistance, school-level outcomes, and individual-level outcomes. (Another predictive chain is posited between demographics, teaching context, and individual outcomes.) The third model predicts external facilitator assistance as a function of his or her position. External facilitators must choose (1) whether to work primarily with administrators or with teachers, (2) whether to emphasize "front end" or "back end" assistance, and (3) whether to concentrate on evaluation or continuation/extension activities. Findings obtained through the application of these models indicate factors that contribute to the success of an implementation effort. Implications for school and district personnel, external facilitators, and state and federal policymakers are discussed. (TE)

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People, Policies, and Practices: Examining the Chain of School Improvement, Volume III

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Models of Change

EA 016 482

Volume III

Models of Change

Joyce Ellyn Bauchner
Jeffrey W. Eiseman
Pat L. Cox
William H. Schmidt

A STUDY OF DISSEMINATION EFFORTS
SUPPORTING SCHOOL IMPROVEMENT

David P. Crandall, Ed.D.
Principal Investigator

The NETWORK, Inc.
Andover, Massachusetts

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PREFACE

The Study of Dissemination Efforts Supporting School Improvement was a comprehensive, three-year examination of a broad spectrum of federal and state dissemination activities. It included a close look at selected strategies designed to improve schools by promoting the adoption and use of new educational practices developed with federal support. Sponsored by the Office of Planning and Evaluation of the U.S. Department of Education, the study was conducted by The NETWORK, Inc., in collaboration with several other research and development organizations, including the University of Texas' R&D Center for Teacher Education, the American University's Knowledge Transfer Institute, the Center for Policy Research and UCLA's Center for the Study of Evaluation.

The study examined four distinct levels of the educational system: federal, state, external agent, and local. A "zoom lens" design began with an overview of forty-five programs in the U.S. Department of Education that engaged in dissemination or dissemination-related activities. Fifteen of these programs were selected for in-depth analysis at the federal level. At the state level, we examined dissemination activities in ten states representative of the continental forty-eight.

Four strategies, each reflected in a selected federal program, were chosen for in-depth investigation at the local level. The strategies, and their programmatic exemplars, are:

- Interpersonal Linkage of Validated Practices, exemplified by the National Diffusion Network (NDN), including its ESEA Title I subnetwork

- Commercial Distribution, exemplified by the Bureau of Education for the Handicapped Marketing Program

- State Administration of Dissemination, exemplified by ESEA Title IV-C Adoption Grants

- Local Development/Invention, exemplified by ESEA Title IV-C Development Grants

A close look at 146 schools and school districts in the ten states, whose improvement efforts were supported by one of these programs, allowed us to answer three important questions:

1. To what extent are new practices supported by the federal programs being implemented in schools?

2. What factors influence successful implementation?

3. How are policies, conceived at one level, implemented at other levels?

Because three of the four programs chosen rely on implementing practices developed outside the local setting, we were interested in the vehicles employed by the programs for dissemination, particularly the assistance provided by external agencies and individuals.

Focusing-in the lens one more time, we conducted an intensive field study of twelve of our local sites over the course of a school year. Here, we were able to examine the interpersonal and organizational dynamics surrounding implementation as school people worked to incorporate innovative practices.

The study as a whole was a massive effort that required the energies and resources of countless people. Altogether, we:

- interviewed and surveyed over 5,000 educators;
- accumulated over 1500 hours of interview tapes;
- spent over 700 person-days "on the road;"
- made approximately 150 observations; and
- analyzed over 400 documents.

The three years were spent in design (Year 1), data collection (Years 1 and 2), and data analysis (Years 2 and 3).

The master report, People, Policies, and Practices: Examining the Chain of School Improvement, consists of ten volumes which describe the results of the study. Volume I (Setting the Stage for a Study of School Improvement) sets the study within a framework of federal school improvement policies and past studies of these policies. The objectives, design, and research methodologies used in the study are also described.

Volume II (Portraits of the Changes, the Players, and the Contexts) describes what was found in the 146 school districts that comprised our local site sample. Characteristics of the people, the innovations, and the settings are reported, as are the contributions of external assistance and the outcomes accrued from involvement in school improvement.

Volume III (Models of Change) introduces the causal models of the school improvement process that helped us determine what factors influenced success. The findings are reported for several outcomes at both the organizational (school) and individual (teacher) level.

In Volume IV (Innovation Up Close: A Field Study in Twelve School Settings), we examine the dynamics of twelve districts -- varying in experience with the new practices, in community type, and in the scope of their efforts -- involved in improvement efforts supported by the National Diffusion Network or ESEA Title IV-C

Local Development Grants. The volume provides an in-depth picture of the motivations, behaviors and aspirations of school people as new practices are implemented and maintained.

Volumes V, VI and VII analyze the government's role in dissemination for school improvement. In Volume V (Dissemination for School Improvement: An Analysis of Nine Federal Education Programs), we profile nine widely different federal programs sponsored by the then U.S. Office of Education. The volume examines the assumptions underlying the programs, and how these shaped each program's dissemination strategy.

In Volume VI (Dissemination at the National Institute of Education: Contending Ideas about Research, Practice, and the Federal Role), six federal dissemination programs funded by the NIE are examined. We tell the story of the programs' emergence, implementation, and -- to the degree possible -- impact, and discuss implications of the programs for the federal role in dissemination.

In Volume VII (Configuration of Federal and State Dissemination Activities), we present a comparative analysis of federal-state relationships for dissemination and school improvement in our ten sample states. We examine the impact of federal initiatives and other critical influences on the roles and operations of state education agencies.

Volume VIII (The Infrastructure of Innovation: The Case of the National Diffusion Network) examines the communication and rewards structure of a single federal program -- the National Diffusion Network. We examine the NDN as a decentralized service delivery system which has evolved to a grass-roots effort with greatly reduced dependence upon federal leaders for direction and control. Network analysis, based on a census of all members and adjuncts of the NDN, provides interesting insights into a unique federal program.

Volumes IX and X summarize our efforts. Volume IX (Implications for Action) integrates findings from all components of the study, and discusses implications for policy and practice at all levels of the educational enterprise. Volume X, our Executive Summary, provides a distillation of study methods and findings for a general audience, as well as an annotated bibliography of the report series and related study documents.

ACKNOWLEDGEMENTS

The Study of Dissemination Efforts Supporting School Improvement engaged literally a cast of thousands. At the peak of activity, it involved some 5,000 educators from all parts of the country, with a wide range of roles and responsibilities, whose only commonality was the desire to improve the education of our nation's youth. Although it is impossible to personally thank everyone, we pause here to acknowledge their important contributions.

Our Project Officer: Ann Bezdek Weinheimer, for her superb guidance and unending support;

Our Policy Advisory Group: Dave Clark, Ellie Farrar, Michael Fullan, Hendrik Gideonse, Egon Guba, Milbrey McLaughlin, David Wiley, and Ward Mason, for their help in conceptualization and design, and their thorough and honest feedback;

Our Senior Consultants: Jeff Eiseman, Gene Hall, Ann Lieberman, Matt Miles, and Bill Schmidt, for keeping us on track early in the study, and contributing substantively to design, analysis and reporting;

Our NETWORK Study Team: Charles Thompson, Jim Taylor, Joyce Bauchner, Glenn Shive, Judy Taylor, Susan Loucks, and Pat Cox for late nights and longer days, and contributing a significant piece of their lives;

Our Subcontractor Teams: Gene Hall, Susan Loucks, Archie George, and Susan Heck at the University of Texas R&D Center for Teacher Education; Ron Havelock, Pat Cox, Michael Huberman, Gwen Moore, Nanette Levinson and JoAnn Goldberg at the American University Knowledge Transfer Institute; Matt Miles and Beverly Taylor at the Center for Policy Research; Jay Guenon and Bill Paddock at Lam, Inc; and Adrianne Bank and Nancy Snidman at the UCLA Center for the Study of Evaluation, for their commitment to the spirit and hard work of collaboration, and their significant contributions to components of the study;

Our Field Coordinators and Researchers from each organization: David Zacchei, Wendy Gelberg, Marian Grogan, Renee Lerche, Mike Mayo, Paulette Meleen, Larry Vaughan, Stone Wiske, Barbara Abeles, Warren Berube, Harvey Bondar, Debbi Miles and Susan Solat at The NETWORK; Lila Oshatz, Evelyn Gilbreath, Eddie Henderson, Vivian Smith, Suzie Stiegelbauer, and Margaret Valentine at Texas R&D; Pat Cox, Dawn Badrick, Nancy Smith, Sheila Wolfe and Ann Kelleran at the Knowledge Transfer Institute, for their dedication to "bring'em (the data) back alive" in the face of thousands of miles of travel, coping with balky tape recorders, living out of suitcases and strange motel rooms for weeks at a time, and for representing us in a thoroughly professional way to new and unfamiliar folks day after day;

Our NETWORK Support Team: Pat Bales, Margaret Broderick, Ronna Coppola, Kory Hellmer, Clif Lund-Rollins, Elsa Martz, Nancy Lund, Nick Thorkelson, Annmarie Lenson, and Ruth Anne Shepard who edited, typed, organized, copied, served, drew, retyped, collated, hustled, and cleaned up after us times too numerous to mention, for all of that and more;

And finally, to the people who other studies label "respondents" but whom we considered and related to as "collaborators": over 4,000 teachers, nearly 400 building and district administrators, 100 people in external assistance roles, 50 personnel in ten state departments of education and 100 federal program staff, for their dedication to making schools a better place for people, and helping us learn the good news:

SCHOOL IMPROVEMENT EFFORTS ARE ALIVE AND WELL
IN SCHOOLS ACROSS THE U.S.!

And, on a more personal note:

They said it couldn't be done; parts of it, yes. The whole humongous thing? No way! But we believed, we persevered, and we succeeded.

Managing (producing?) an enterprise of this scale and complexity was not unlike being entrusted with a string of race horses while also being expected to efficiently operate race tracks all over the country. One's charges must run, sometimes for practice, sometimes in claim races, sometimes for fun, and sometimes for substantial purses. At the tracks, stands must be cleaned, popcorn purchased, receipts counted, special events trumpeted, sound systems repaired. Oh yes, add to this the necessity of producing a comprehensive story of each season's successes (and failures), with appropriate statistical detail for the aficionados and photos for the occasional attendee. Perhaps such images will help you connect with the range of reactions I have had to this point, when all that remains of the season is the final manuscript which down-plays the thrills and recalls the tribulations.

Although flashes of Hercules and his labors in the stables come to mind, as do painful recollections of the occasional reluctance of the imported studs to perform as desired, and more than a few false breaks at the gate, overall I am immensely satisfied with both the process and the product of our collective odyssey. On balance, it was a frolic with a wonderful group of thoroughbreds.

All the players in our production performed admirably; their contributions were manifold. Three are worthy of special mention, one whose contribution was the necessary catalyst at the front-end, enabling our adventure to commence and continue; one whose firm hand kept us on our course; and another whose contribution at the back-end ensured the successful conclusion and chronicling of our journey with style and substance. My very special thanks to:

Ann Bezdek Weinheimer, whose courage in championing our unconventional approach launched us on our journey with confidence. During the study, Ann was our trailblazer and guide through the bureaucratic thickets. We benefited mightily from her detailed and hard-hitting critiques, her unwavering support for our efforts through the low moments and her praise at the high ones. Perhaps most of all, we treasure her belief in us and her infinite patience.

Joyce Bauchner, whose truly special ability moved us from abstract conception to earthly operation. Her commitment to task execution and consummate attention to detail served the study better than the best Master Sergeant. (Plus she's incredibly bright and doesn't smoke cigars.) Her formal titles and responsibilities belie the breadth and depth of her contribution to thinking up and working through this massive endeavor. As she remarked more than once, "Well, no one has ever done this before, but let's get on with it." And we did. My plans and our various teams' intentions, difficult as they were to arrive at, were just the first step. Seeing that they were carried out, by dispersed groups in six locations, on time and budget and in keeping with the overall conception was up to Joyce. Without her we'd still be picking up the stragglers and searching for the lost interview tape.

Susan Loucks, whose capacity for concentration, sustained high quality output and tolerance for my idiosyncracies is surpassed only by her unparalleled modesty, calm and good humor, is the single most important reason that the complex innovation of this study is represented through its master report series and numerous other publications. Individual authors have each made significant contributions in their own right. Weaving individual strands of reasoning into a coherent fabric that is both sturdy and stylish stands as the latest in a string of behind the scenes contributions that have been too often unacknowledged. Hers has been the longest and hardest race of all, because it's been run after the others have bedded down and the spectators have left the track. Had this been a race for the roses, the bouquet would belong to Susan.

Each has contributed in a special way to my realizing a major dream. From a field of exceptionally talented thoroughbreds, they have been a trio of true believers. Without these three, it wouldn't have happened; with them, I would try anything.

David P. Crandall, Ed. D.
Principal Investigator

SUMMARY: VOLUME III

Volume III focuses upon a three-part question dealing with the process of implementing innovations: What configurations of variables predict (a) individual-level outcomes? (b) school-level outcomes? and (c) the kind of assistance that external facilitators provide? To answer this question, we developed, tested and revised models of three aspects of the dissemination/implementation process. All three of our final versions are fully supported by our data. Below, we describe both general and specific features of the final version of each model. Finally, we set forth some implications.

The Model Predicting Individual-Level Outcomes

According to our data, the dynamics of implementation depend upon the amount the teachers are expected to change their instructional practice: while we can confidently describe relationships between predictor variables and outcome measures for teachers who are expected to change their practice in major ways, such relationships are far less predictable when the "magnitude of required change" is moderate or low. Below, we refer only to situations in which teachers are expected to make major changes.

The general features of the final version of our model predicting individual-level outcomes are that:

- readiness, elapsed time, and time spent on practice-related activities all predict outcomes;
- both assistance and practice characteristics also predict outcomes, not only directly, but also indirectly (through time spend on practice-related activities);
- the more time spent on practice, the greater the teacher's commitment and vice versa; similarly, the more that teachers perceive that the implementation is yielding positive outcomes, the greater the teacher's commitment and vice versa.

Turning to the model's specific features, here are four individual-level outcomes, along with variables that predict them.

- The positive predictors of perceived benefits are outside help, principal help received, local facilitator help, and change in practice; a negative predictor is how much the external facilitator works with administrators.
- The positive predictors of change in practice are local facilitator help and readiness; the negative predictors are how much time the external facilitator spends (a) training teachers, and (b) with administrators.

- *Time spent communicating about the practice* positively predicts *practice-specific mastery*.

- A positive predictor of *fidelity* is the amount of help teachers report they received from the principal.

The Model Predicting School-Level Outcomes

The general features of the final version of our model predicting school-level outcomes are that:

- *demographics* predicts *administrative context*, which predicts *practice-specific assistance*, which predicts both *school-level outcomes* and *individual outcomes* (the individual outcomes in this model are different from those in the model predicting individual-level outcomes); and

- *individual outcomes* are also predicted by *another* chain starting with demographics: *demographics* to *teaching context* to *individual outcomes*.

Here are some of the model's specific features:

- *Teacher commitment* is predicted by *local facilitator activity* and *teacher control over implementation*; the more the practice is perceived to solve real problems, the greater the teacher's commitment and vice versa.

- *External facilitator activity* positively predicts *organizational change*.

The Model Predicting External Facilitator Assistance

An external facilitator's *position* predicts his or her general orientation toward providing assistance, which in turn predicts the kind of assistance he or she provides at specific sites. For example, compared to project *staff*, project *directors* spend more time both on initiation/awareness activities and in working with administrators. External facilitators tend to make three fundamental choices:

- whether to work primarily with administrators or primarily with teachers,

- whether to emphasize "front-end" or "back-end" assistance, and for those who choose to emphasize the latter,

- whether to concentrate on evaluation or continuation/extension activities.

Implications

From our data, unless principals are the district expert on a practice, they should stay clear of the details of its implementation. Instead, they should demonstrate their commitment to its successful implementation by ensuring:

- that teachers understand both the relationship between the practice and the school's top priorities, and that the practice's key components are to be implemented,
- that teachers have access to knowledgeable resource persons,
- that the requisite materials are available, and
- that everyone involved develop a two-to-five year time perspective.

In addition, principals should work to maintain a school-wide environment conducive to ongoing, systematic problem-solving.

Central office administrators should actively involve and publicly legitimize both external and local (i.e., central office level) facilitators. Furthermore, they should ensure:

- that local facilitators have sufficient released time to prepare for and carry out their responsibilities;
- that all facilitators coordinate their activities so that all necessary functions are sufficiently carried out (see the paragraph below); and
- that principals understand the material above.

Both external and local facilitators should perceive the implementation task as a process of working toward the achievement of:

- individual-level behavioral outcomes (change in practice, fidelity, and mastery of the practice),
- individual-level perceptual-affective oucomes (perceived benefits, teacher commitment, and how much the practice is perceived to solve problems), and
- school-level outcomes (organizational change, plans for continuation, and institutionalization).

Accordingly, they should collaboratively work out an ad hoc division of labor for working toward these outcomes, one that takes account of both

- which kind of facilitator typically helps to achieve which kind of outcome (External facilitators tend to be more helpful with fidelity, practice-specific mastery, and organizational change; local facilitators tend to be more helpful in galvanizing the staff, and inducing them to think about their problems and how the innovation can address them); and

- the nature of each facilitator's skills and personality characteristics.

In addition, the facilitators should ensure that a central office administrator committed to the practice bless and coordinate their division of labor agreement.

Finally, our analysis convinces us that policymakers should:

- support development, validation, and dissemination activities independently (i.e., not fund recipients from the outset to do all);
- insist that validated practices be implemented faithfully;
- fund both external facilitators who thoroughly understand particular validated practices and those with process skills who know about many;
- award multi-year adoption grants to local districts that commit themselves to make major changes; and
- underwrite the development of model programs for preparing educational facilitators, ultimately encouraging states to make appropriate modifications in their certification requirements for district level personnel.

VOLUME III: MODELS OF CHANGE

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INTRODUCTION

In Volume I: Setting the Stage for a Study of School Improvement, we described how the previous studies and the strategies we explored emerged from a long line of inquiry into the process of school improvement, and we set forth our study design. In Volume II: Portraits of the Changes, the Players, and the Contexts, we described the people, the practices, and the outcomes of the school improvement efforts we examined. To explore our hypotheses regarding what combinations of variables will predict other school improvement variables, especially the outcomes of implementation, we decided to create and test structural models of the implementation process. In this volume, then, we present the structural models we developed, the variables they contain, the results of testing them on our data, and our conclusions.

Two orienting notes before beginning. First, this volume is written generally for the researcher or the research-oriented practitioner. Much of it reports the results of our model testing in a straight-forward fashion: e.g., variable A is significantly related to variable B. A few sections interpret the meanings of these relationships, notably Chapters III and VI. Chapter VIII recommends actions based on our learnings. This breakdown may help guide your reading.

Second, the word "predicts" is used often in this volume; e.g., "the amount of help given by a local facilitator predicts teachers' change in practice." We purposely do not use words such as "causes" or "influences," since we cannot say that if one thing is done, another thing will happen. This statement of causality is too absolute. We can say, however, that there is a good probability that if one thing is done, the other thing will happen. Our models give us this ability to "predict" the relationship between two variables, since the model-testing both controls for the influence of other variables and tells us the direction of the relationship. Thus, the repeated use of the word "predict."

Section 1: Overview of the Models

In thinking about the implementation process, we conceived of two major domains of activity: the school district and the world of the external facilitator. During implementation, external facilitators and school district personnel come into contact, but such contact is limited. Factors beyond this limited contact affect the actions of individuals in both role groups. Accordingly, we constructed models to predict aspects of both domains of activity.

Ultimately, we were interested in being able to predict the outcomes of implementation. In reading the literature, we had noticed that researchers often talked about these outcomes as if they were school-level variables, but then used measurement procedures that operationally defined them as individual-level variables. We decided that there were valid reasons to treat them as both, provided that:

- each type of outcome was measured appropriately, and
- care was taken to be clear regarding which was being discussed when.

This discussion led us to construct two local school models, one predicting individual-level outcomes, and the other predicting school-level outcomes. Altogether, then, we constructed three models:

- one predicting external facilitator assistance activity,
- one predicting school-level outcomes, and
- one predicting individual-level outcomes.

The variables in the external facilitator assistance model do not overlap with those in the local school model with the exception of the macrovariable external facilitator assistance, which connects the models as shown in Figure 1.

Figure 1: The Relationship Between the External Facilitator Assistance Model and Local School Models

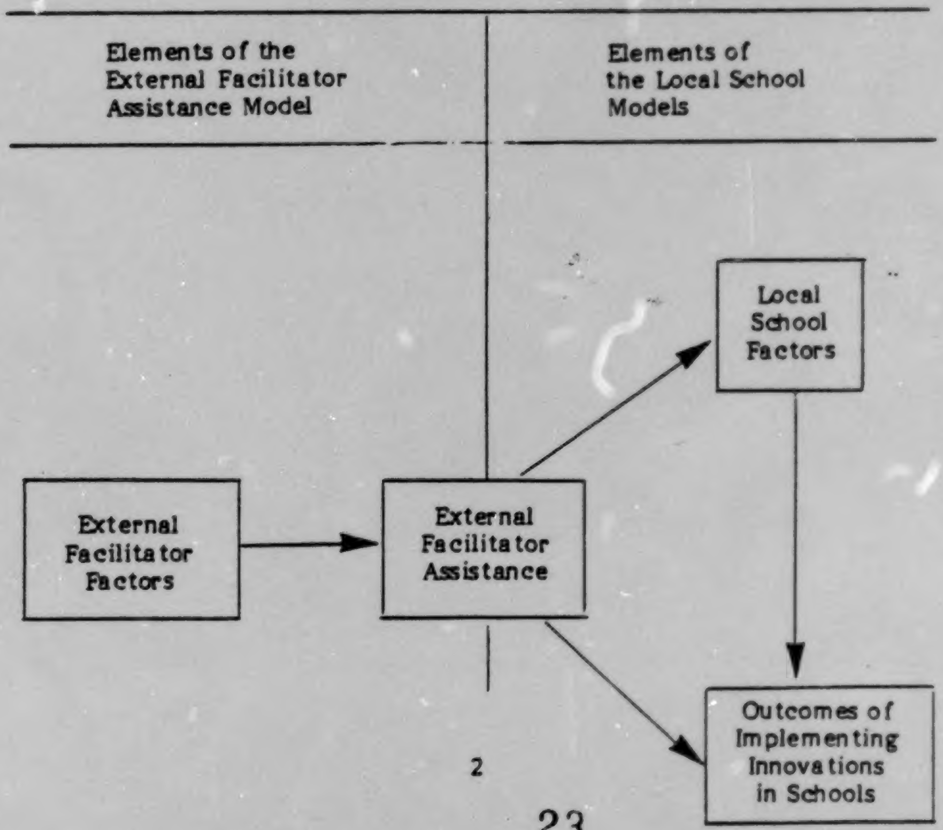

Elements of the External Facilitator Assistance Model
Elements of the Local School Models
Local School Factors
External Facilitator Factors
External Facilitator Assistance
Outcomes of Implementing Innovations in Schools

Figure 2 displays the general structure of our model predicting individual-level outcomes. Note that we hypothesized

- that the various kinds of assistance given to teachers who are trying to implement a new practice can be functionally grouped into three categories: external help, district-level help, and school-level help;
- that this cluster of assistance macrovariables would predict the outcomes of implementation directly;
- that assistance would join with several other factors to predict teacher commitment;
- that assistance and teacher commitment would join with two other factors to predict time spent on practice-related activities and
- that time spent on practice-related activities would join with a few other factors to predict our implementation outcomes.

This may seem more complicated than it is. To grasp the quintessence of our model, ignore for the moment the factors that appear above and to the left of teacher commitment and below time spent on practice-related activities. Note that what is left can be summarized by the three simple propositions:

- that increasing the commitment of teachers to a new practice will lead to their spending more time working on its implementation;
- that increasing the amount of time teachers spend working on the implementation of a practice will lead to better outcomes; and
- that increasing the amount of help teachers receive from any source will lead to better outcomes not only directly, but also somewhat indirectly through increasing time spent on practice-related activities and quite indirectly through increasing teacher commitment.

When we turn our attention to the factors that we temporarily set aside, we see that we have only hypothesized three patterns:

- five factors only influence the outcomes of implementation directly,
- two factors impact on the outcomes of implementation solely by influencing teacher commitment; and
- two factors impact on the outcomes of implementation both directly and through time spent on practice-related activities.

Figure 2: General Structure of the Model Predicting Individual-Level Outcomes

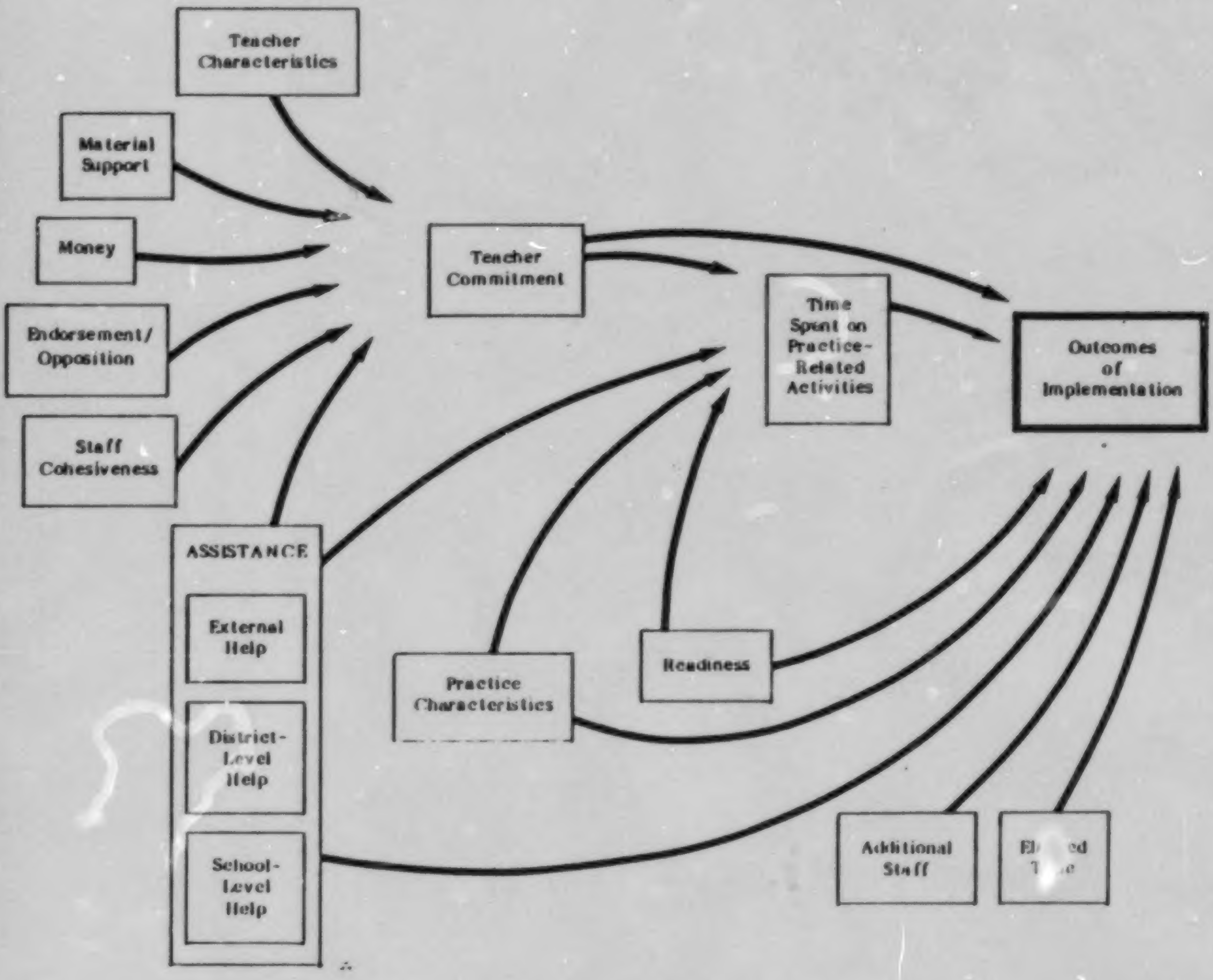
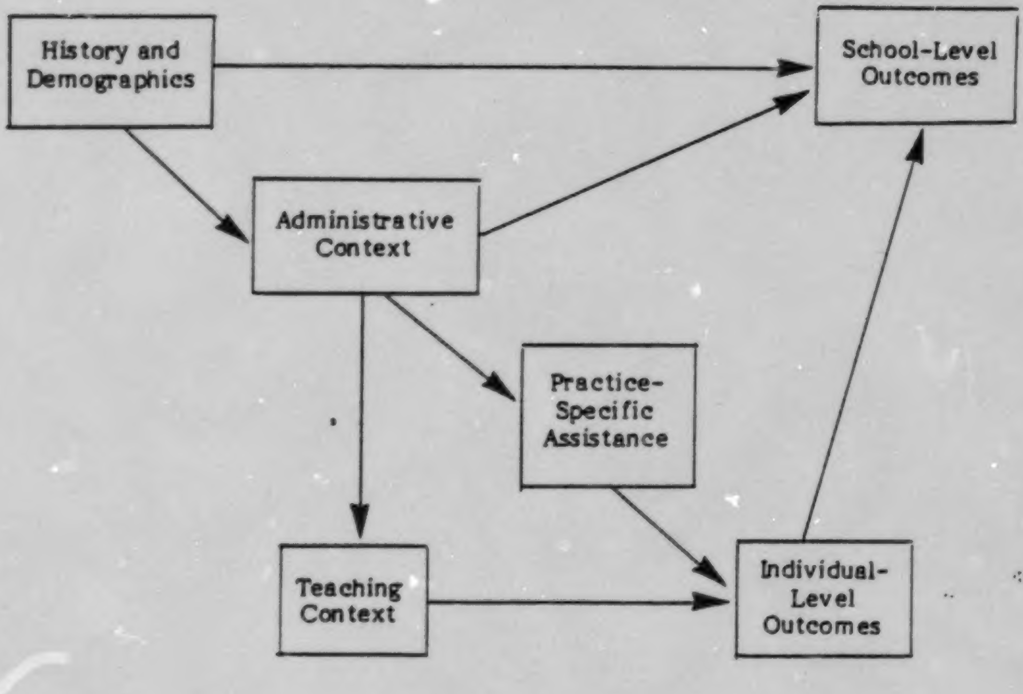

Teacher Characteristics
Material Support
Money
Endorsement/ Opposition
Staff Cohesiveness
ASSISTANCE
External Help
District-Level Help
School-Level Help
Teacher Commitment
Time Spent on Practice-Related Activities
Outcomes of Implementation
Practice Characteristics
Readiness
Additional Staff
Elapsed Time

Figure 3 displays the general structure of our model predicting school-level outcomes. Note that we hypothesized:

- that school-level outcomes would be predicted by three factors: history and demographics, administrative context, and individual-level outcomes; and
- that administrative context would predict practice-specific assistance and teaching context, which together would predict individual-level outcomes.

Figure 3: Initial Conceptualization of the Model Predicting School-Level Outcomes

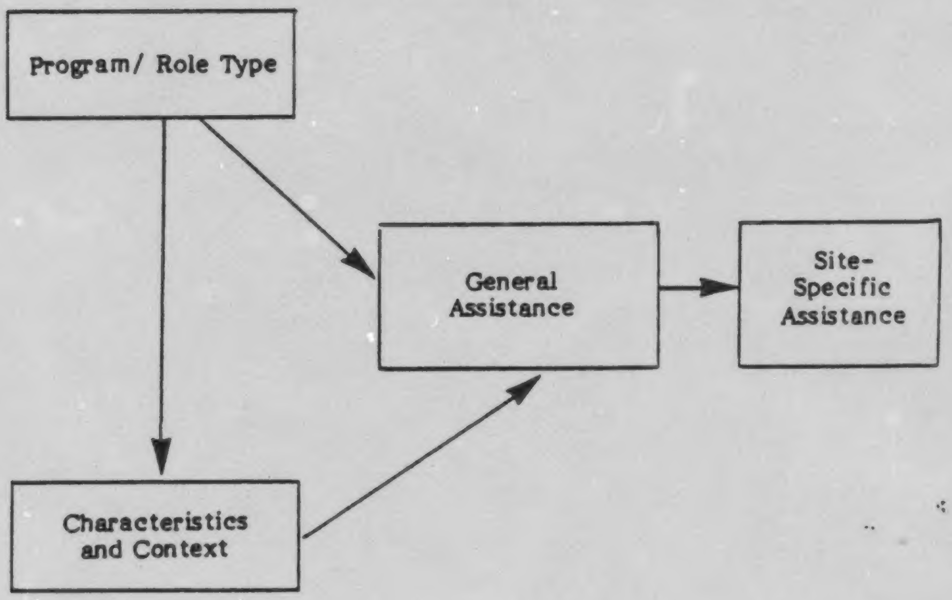

History and Demographics
School-Level Outcomes
Administrative Context
Practice-Specific Assistance
Teaching Context
Individual-Level Outcomes

In other words, we assumed that whereas school-level outcomes are directly affected by history and demographics and by administrative context, they are also indirectly affected through the accumulation of individual-level outcomes.

Finally, Figure 4 shows the general structure of our remaining model. We hypothesized

- that the program for which external facilitators worked and the roles that they enacted would predict their characteristics and context;
- that collectively program/role type and characteristics and context would predict the assistance external facilitators provide in general; and
- that the assistance that external facilitators provide in general would predict site-specific assistance.

Figure 4: General Structure of the Model Predicting External Facilitator Assistance


Program/ Role Type
General Assistance
Site-Specific Assistance
Characteristics and Context

Note that the macrovariable site-specific assistance, which the model predicts, is identical to the macrovariable external facilitator assistance, which is a predictor in the local school models.

Section 2: Organization of the Volume

The remainder of this volume is divided into three parts:

- Predictors of Outcomes of Implementation. Part One contains three chapters: in Chapters I and II, we describe the results of testing the models predicting individual-level and school-level outcomes, respectively; in Chapter III, we discuss what our findings imply regarding the roles that various key actors play in the implementation process.

- Predictors of External Facilitator Assistance. Part Two also contains three chapters: in Chapter IV, we describe the results of testing our hypotheses regarding the predictors of the predispositions of external facilitators to provide assistance; in Chapter V, we describe the results of testing our guesses regarding the direct predictors of actual external facilitator activity; and in Chapter VI, we integrate the two sets of findings.

- Conclusion. Finally, Part Three contains two chapters; in the first, we summarize our findings, and in the second, we discuss a few key implications.

As noted earlier, this volume is written for the researcher and research-oriented practitioner. The more technically oriented reader should see Volume I for discussions of our decisions regarding such research design issues as:

- which methods of analysis to use,

- which computer programs to use,

- how to deal simultaneously with different levels of analysis so as to obtain unbiased estimates of cross-level effects, and

- how to deal with incomplete data sets.

The practitioner who is not research-oriented may find it useful to start with Chapters III, VII, and VIII of this volume, and then to turn to Volume IX: Implications for Action.

PART I: PREDICTORS OF OUTCOMES OF IMPLEMENTATION

CHAPTER I: PREDICTORS OF OUTCOMES OF IMPLEMENTATION AT THE INDIVIDUAL LEVEL

The ultimate outcomes of implementation predicted by the individually focused model are the benefits that have resulted from implementing the new practice. We hypothesized that the most proximate predictors of these benefits were three variables that focused upon teacher actions related to implementing the practice: change *in* practice, practice-specific mastery, and fidelity (see Section 1 for definitions of these variables). We considered each of these an implementation outcome in its own right.

In Figure 2, we displayed the general structure of our model predicting individual outcomes. Now, in Figure 5, we elaborate our presentation by displaying the implications of differentiating between the proximate and ultimate outcomes of implementation.

Section 1: The Variables[1]

We have grouped together functionally the variables contained in the individually focused model:

Implementation Outcome Variables

- Perceived benefits: the number of benefits (gains) that teachers reported receiving as a result of using the practice.
- Change in practice: the difference between a teacher's current practice (i.e., that resulting from implementing the practice of interest), and his or her past practice, calculated from the scores on a Practice Profile.[2]
- Practice-specific mastery: a measure of whether and then how the new practice was being used. This variable is

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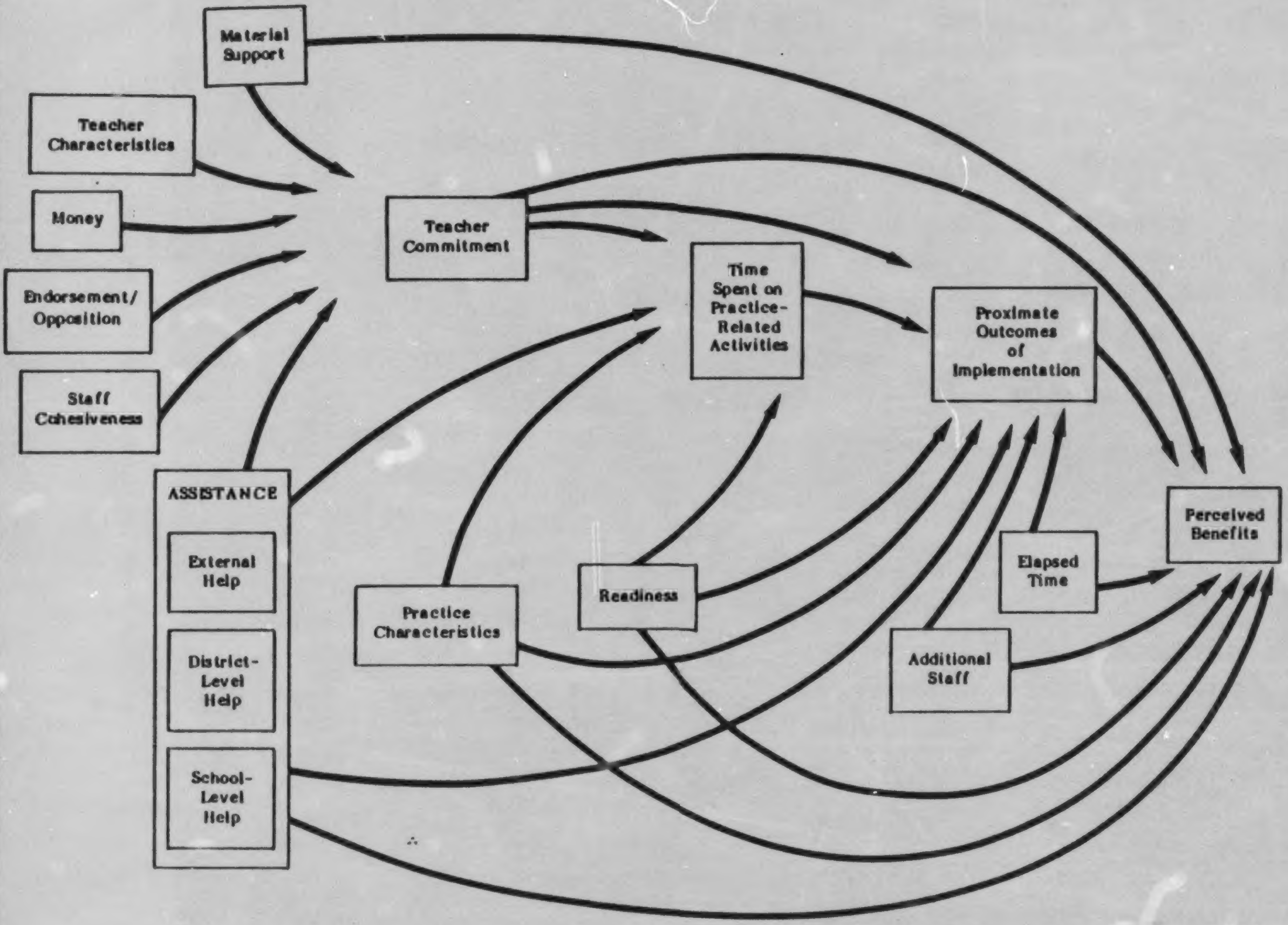
[1] The variables described in this volume are defined in Volume II: Portraits of the Players, the Changes, and the Contexts; details of their measurement and frequency distributions for our sample are also provided.

[2] The construction of Practice Profiles, employing a method based upon the concept of innovation configurations (Hall and Loucks, 1981), enabled us to create "standardized" scores for each teacher-innovation pair. The profiles allowed us to determine how much practice change had in fact been demanded by the innovation, how much change had resulted from implementation to date, and to what extent a faithful replication had been achieved. Details of the procedure are available both in Loucks and Crandall (1982) and in Chapter IV of Volume I.

Figure 5: An Elaboration of the Model Predicting Individual-Level Outcomes


Material Support
Teacher Characteristics
Money
Endorsement/ Opposition
Staff Cohesiveness
Teacher Commitment
Time Spent on Practice-Related Activities
Proximate Outcomes of Implementation
Perceived Benefits
ASSISTANCE
External Help
District-Level Help
School-Level Help
Practice Characteristics
Readiness
Elapsed Time
Additional Staff

equivalent to Level of Use (LoU) developed by Hall, Loucks, Rutherford, and Newlove (1975); as in their measure, eight levels are possible: nonuse, orientation, preparation, mechanical use, routine use, refinement, integration, and renewal.

- Fidelity: the extent to which the implemented practice is similar to the developer's ideal version of that practice. (Fidelity is determined by comparing the Practice Profile of the implemented practices with that of the developer's ideal version.)

Predictors of Both Proximate Implementation Outcomes and Perceived Benefits

Most of the predictors shown in Figure 5 are not individual variables. Rather, they are clusters of variables that we have grouped together for conceptual clarity. In the lists that follow, we describe each cluster generally. We then "unbundle" each cluster, introducing the variable names and definitions that will be part of our report of findings, which begins on page 13. Those predictors that are not clusters are designated as "variables."

- Additional staff: this variable indicates whether implementation resulted in the addition of new staff.

- External help: this includes multiple measures of the help teachers received from anyone outside of the school district, particularly the external facilitator.

    - Outside help: teachers' report of the amount of help received from anyone outside the district.

    - External facilitator help: external facilitator's report of the amount of assistance given to a site. The multiple factors of this variable are described in detail in Volume II.

- District-level help: this includes multiple measures of the help given by district-level personnel.

    - Local facilitator help: local facilitator's report of the amount of assistance given to a site.

    - Central office help: teachers' report of the amount of help received from district level personnel (incuding administrators, coordinators, etc.).

- Elapsed time: this variable measures the number of days the teacher had been implementing the practice.

- School-level help: this includes multiple measures of the amount and type of assistance provided to teachers by the principal and/or fellow teachers.

  -- Principal help given: principal's report of the amount of assistance given in support of implementation.

  -- Principal help received: teachers' report of the amount of help received from the principal.

  -- Staff help: teachers' report of the amount of help received from other teachers and teacher leaders (e.g., department chairs, team leaders).

- Teacher commitment: this variable represents both the degree to which a teacher was motivated to do the things needed to implement the new practice, and the teacher's disposition toward the practice.

- Practice characteristics: this contains multiple measures of attributes of the practice.

  -- Implementation requirements: the relative amount of items and arrangements necessary for a school to implement the practice (e.g., user skills, money, materials and equipment, personnel, training, organizational arrangements).

  -- Complexity: the relative number of items (e.g., time, materials, classroom organization, roles to coordinate) that the primary user has to take into account in order to implement the new practice.

- Readiness: this variable describes the degree to which conditions and resources, such as teacher motivation, skills, materials, and funds, that were needed for implementation, already existed in the school prior to adoption of the new prctice.

Predictor of Proximate Implementation Outcomes (but not of Perceived Benefits)

- Time spent on practice-related activities: this includes measures of the amounts of time a teacher spent on various kinds of practice-related activity.

  -- Time spent on classroom use: teachers' report of the amount of time spent using the practice with students.

  -- Time spent on materials: teachers' report of the amount of time spent developing and organizing materials for use with the practice.

-- Time spent on training: teachers' report of the amount of time spent learning about and preparing themselves for use of the practice.

-- Time spent on evaluation: teachers' report of the amount of time spent monitoring, record keeping, and assessing the impact of the practice.

-- Time spent on communicati[illegible] teachers' report of the amount of time spent talk[illegible]o others about and training others in use of the pra[illegible]e.

Predictors of Time Spent on Practice-Related Activities

All of the concepts that predict outcomes of implementation are also posited as predicting time spent on practice-related activities. The variable below is posited as predicting time spent on practice-related activities only.

- Staff cohesiveness: this variable represents not only the degree to which teachers in a building worked either as individuals, in separate groups, or as a whole, but also the principal's relationship to these interaction patterns.

Predictors of Teacher Commitment

- Teacher characteristics: this includes variables that characterize the teacher.

  -- Experience: number of years of teaching experience.

  -- Professionalism: number of courses taken, training events and conferences attended, and professional journals read regularly by the teacher.

- Material support: this variable indicates whether or not the school purchased new materials or supplies in order to maintain use of the practice.

- Money: this variable indicates whether the school budget included any separate line items to support use of the new practice.

- Endorsement/opposition: this represents the amount of endorsement and opposition that teachers perceived to exist among various groups in the school and community toward the practice.

  -- Endorsement: teachers' report of the number of groups and/or individuals that endorsed use of the practice.

  -- Opposition: teachers' report of the number of groups and/or individuals that opposed use of the practice.

Section 2: The Findings

Before presenting our findings, we briefly describe the data sets upon which they are based.

The Nature of the Data Sets

The samples upon which we tested our individually focused model differed from one another along three dimensions:

- whether the predictors were individual-level or site-level variables,
- whether certain federal school improvement strategies were included vs. excluded, and
- whether teachers were confronted with the expectation that they make major or minor changes.

Individual-Level vs. Site-Level Predictors

The model predicting individual-level outcomes contains some variables measured at the individual level (i.e., describing specific teachers), and some measured at the site level (i.e., describing specific school buildings or districts). Although we were able to gather a complete set of data on the individual-level variables, we missed data on some of the site-level variables.

Inclusion vs. Exclusion of Selected Federal School Improvement Strategies

As we explained in Chapter II of Volume I, each of the implementation efforts in our sample was connected to a government strategy for fostering school improvement, as well as to a federal or state program that was the operationalization of that strategy. We constructed a single model to predict individual-level outcomes under the assumption that certain relationships among variables -- including relationships between predictors and outcomes of implementation -- remain stable across school improvement strategies. But what if we were wrong? What if the nature of the relationships among school improvement variables depend upon the strategy-in-use? We had to collect and analyze our data in such a way that we could find out.

Accordingly, we tested the model on teachers from three progressively homogenous populations:

- All-Programs Sample. This population included all of the teachers we interviewed who had been attempting to implement practices as part of school improvement efforts under the auspices of (1) the National Diffusion Network, (NDN)

(2) State-Administered dissemination through ESEA Title IV-C Adoption grants, (3) the Market Linkage Program used by the Bureau of Education for the Handicapped (BEH), and (4) ESEA Title IV-C Local Development grants.

Since the probability of achieving statistically significant results *increases* as either *sample size* or *predictor variance* increases, and since the All-Programs sample was *both larger* and *more diverse* than either of our more *restricted* samples -- given that it included all the strategies (and therefore all the programs) we studied -- we expected to obtain our most clear-cut findings from this sample. If, when we tested our model upon the two more restricted samples described below, we obtained only a few findings that contradicted those culled from our All-Programs sample, we expected to conclude that such findings were anomolous, and that we had received firm support for our hypothesis (that the conditions yielding favorable outcomes hold regardless of the strategy of encouraging schools to experiment with new practices).

- *Dissemination-Only Sample*. This population includes all the teachers in our All-Programs Sample who attempted to implement practices that had been *disseminated from outside the district*. Specifically, this *includes* all the teahers who attempted to implement practices disseminated under the auspices of either the NDN, the BEH Marketing Program or of State-Administered ESEA Title IV-C programs; it *excludes* the teachers who were implementing practices developed *locally* under ESEA Title IV-C grants.

- *NDN Sample*. This population includes only those teachers in our Dissemination-Only Sample who attempted to implement practices disseminated under the auspices of the NDN.

Teachers Confronted with *Major* vs. *Minor* Changes

Our initial analyses of our individually focused model were frustrated by the dreaded "no significant differences" result. The application of our best minds to the dilemma (plus some good old-fashioned luck) led us to an apparently straight-forward proposition, albeit one that had been untestable until the development of a study design that yielded case-by-case data on each innovation-user pair. We found that, in general, teachers for whom a new practice represents a *major change* (in their instructional procedure) are influenced by dynamics that do not appear to apply to teachers for whom the innovation represents only a *minor change*.

Since we consider this discovery to be an important finding in its own right, we describe in some detail what we mean. As noted earlier, we constructed Practice Profiles (Loucks and Crandall, 1982) for each of the 61 practices studied. To construct a Practice Profile for an innovation, we worked with the developer both to identify the components of the innovation, and to describe ideal, acceptable, and unacceptable versions of each component. When we inteviewed a teacher, we discovered the extent to which his or her previous practice included each component, and if so, whether the included components qualified as ideal, acceptable, or unacceptable. To calculate the amount of required change, we first assigned a teacher a score on each component: 3 if ideal, 2 if acceptable, 1 if unacceptable, and 0 if not present. Second, we subtracted the sum of the teacher's scores from three times the number of components. The larger the difference, the larger the amount of required change. (The teachers in our sample had required change scores ranging from 1 to 36.)

When we tested the model on teachers whose required change scores were 16 or smaller, we found few significant relationships. However, when we tested the model on the 51.6% of the teachers in our sample whose required change scores were 17 or more, we found a respectable number of significant relationships. Combining the two sets of results leads us to our first finding: The process of inducing teachers to change instructional procedures is predictable with reasonable confidence, if and only if they are expected to make either several substantial changes in their instructional procedures, a large number of minor changes, or some combination thereof.

What do we mean by the vague terms substantial and large? Table 1 gives us an indication by showing all of the possible ways of achieving a 17 -- the smallest possible score that qualifies for the major required change group. Note:

- that the implementation process is only predictable if teachers are expected to add or change at least six components; and

- that the smaller the number of components that must be added or changed (to meet the minimum qualification for the major required change group), the greater the magnitude must be of most of these changes.

Table 1: All Possible Combinations of Components to be Added or Changed to Produce a *Magnitude of Required Change* Score of 17

# of components missing from past practice	# of components rated unacceptable in past practice	# of components rated acceptable (but not ideal) in past practice	Total number of components that must be added/changed
5	1	0	6
5	0	2	7
4	2	1	7
4	1	3	8
4	0	5	9
3	4	0	7
3	3	2	8
3	2	4	9
3	1	6	10
3	0	8	11
2	5	1	8
2	4	3	9
2	3	5	10
2	2	7	11
2	1	9	12
2	0	11	13
1	7	0	8
1	6	2	9
1	5	4	10
1	4	6	11
1	3	8	12
1	2	10	13
1	1	12	14
1	0	14	15
0	8	1	9
0	7	3	10
0	6	5	11
0	5	7	12
0	4	9	13
0	3	11	14
0	2	13	15
0	1	15	16
0	0	17	17

Each row in the table represents one of the 33 possible ways that components can be added or changed to achieve a required change score of 17.

Table 2 displays the distribution of teachers between the major required change and minor required change groups by program. Note that the proportion of teachers expected to make major changes ranged from 25% (in the program that used the marketing strategy) to 78% (in the program that encouraged local districts to develop their own innovations).

Table 2: Distribution of Teachers Between the Major Required Change and Minor Required Change Groups by Program

	Major Required Change	Minor Required Change	Row Totals
NDN	42 (43%)	55 (57%)	97 (100%)
BEH Marketing Program	1 (25%)	3 (75%)	4 (100%)
State-Administered Dissemination	19 (58%)	14 (42%)	33 (100%)
ESEA Title IV-C Local Development	21 (78%)	6 (22%)	37 (100%)
Column Totals	83 (52%)	78 (48%)	161 (100%)

Sample Statistics

Since we had identified three program-related populations (the All-Programs, the Dissemination-Only, and the NDN samples) and two groups of teachers (the major required change and the minor required change groups), the reader might expect that the model would be tested upon 3 X 2 = 6 samples. However, the Dissemination-Only minor required change sample was highly similar to the All-Programs minor required change sample -- only differing by the inclusion of six additional teachers in the latter -- we decided against testing the model on the Dissemination-Only minor required change sample. Thus, we only tested the model on five samples.

Table 3 describes each of the five samples (see the bottom row), and shows the contribution of each program to the three sample strategies shown:

- the number of teachers,
- the number of schools that these teachers represent, and
- the number of these schools on which we have a complete set of site-level data.

Note that our largest and most important sample -- namely our All-Programs major required change sample -- contains 83 teachers from 48 schools, on 31 of which we have complete site-level data. In contrast, our smallest sample -- our NDN major required change sample -- is about half as big; it contains 42 teachers from 20 schools, on 16 of which we have complete site-level data.

Statistical Significance of the Model When Tested on the Various Samples

When tested on various combinations of samples and outcomes of implementations, the model predicting individual-level outcomes turned out to be statistically significant some of the time but not others. Table 4 indicates the circumstances under which the model turned out to be significant, and, for such circumstances, also displays the level of significance.

Note:

- that the model turned out to be significant regardless of implementation outcome when testing the predictability of the individual-level variables on the All-Programs major required change sample;
- that the individually focused model was not significant whenever it was tested on site-level variables;
- that the model was not significant when tested on any of the minor required change samples except the NDN sample when the implementation outcome was practice-specific mastery; and
- that the Dissemination-Only and NDN major required change samples turned out to be significant when predicting change in practice and fidelity, but not when predicting perceived benefits and practice-specific mastery.

Should we be pleased or dismayed by these results? We had already adjusted to certain realities:

- that the dynamics of the implementation process for teachers who are only expected to make minor changes are elusive;

Table 3: Samples Upon Which the Model Predicting Individual-Level Outcomes was Tested

	All-Program Samples		Dissemination-Only Sample Composed of	NDN Samples	
	Teachers Expected to Make Major Changes	Teachers Expected to Make Minor Changes	Teachers Expected to Make Major Changes	Teachers Expected to Make Major Changes	Teachers Expected to Make Minor Changes
National Diffusion Network	42 teachers from 20 schools, 16 of which have full site-level data	55 teachers from 36 schools, 20 of which have full site-level data	42 teachers from 20 schools, 16 of which have full site-level data	42 teachers from 20 schools, 16 of which have full site-level data	55 teachers from 36 schools, 20 of which have full site-level data
BEH Marketing Program	1 teacher from 1 school which does not have full site-level data	3 teachers from 2 schools, none of which have full site-level data	1 teacher from 1 school which does not have full site-level data		
State-Administered Dissemination	19 teachers from 14 schools, 7 of which have full site-level data	14 teachers from 12 schools, 6 of which have full site-level data	19 teachers from 14 schools, 7 of which have full site-level data		
ESEA Total IV-C Local Development	21 teachers from 13 schools, 8 of which have full site-level data	6 teachers from 5 schools, 2 of which have full site-level data			
Totals	83 teachers from 48 schools, 31 of which have full site-level data	78 teachers from 56 schools, 28 of which have full site-level data	62 teachers from 35 schools, 23 of which have full site-level data	42 teachers from 20 schools, 16 of which have full site-level data	55 teachers from 36 schools, 20 of which have full site-level data

Table 4: Significance Levels of the Individually Focused Model When Tested on Various Sample/Implementation Outcome Combinations

	Major Required Change				Minor Required Change		
	All-Programs Sample		Dissemination-Only Sample	NDN Sample	All-Programs Sample		NDN Sample
	Individual-Level Variables	Site-Level Variables	Individual-Level Variables	Individual-Level Variables	Individual-Level Variables	Site-Level Variables	Individual-Level Variables
Perceived Benefits	$p < .01$	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Change in Practice	$p < .04$	Not Significant	$p < .03$	$p < .0006$	Not Significant	Not Significant	Not Significant
Practice-Specific Mastery	$p < .04$	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	$p < .008$
Fidelity	$p < .02$	Not Significant	$p < .03$	$p < .02$	Not Significant	Not Significant	Not Significant

- that, given the number of variables involved, both the Dissemination-Only and NDN samples were too small to expect many significant results; and

- that, due to missing data, the samples on which the site-level predictors were small enough that we feel less confident about the reliability of the results.

Thus *one* crucial question for us was whether the model would prove significant when tested on the All-Programs *major required change* sample. Fortunately, each time the model was tested on this sample -- one time apiece for each of the four implementation outcomes -- the results were significant. But statistical significance is not the only criterion of success. "Statistical significance" only means that a set of results is robust enough so that it is unlikely to have been obtained purely by chance.

More crucial is the *size* of the relationships obtained, or, more technically, the *amount of variance* that the model explains. Table 5 displays the amount of variance explained for each test of the model that proved significant. Note that the amount explained varies from 29% to 65%. It averages 51%.

Table 5: Amounts of Variance Explained When the Model Predicting Individual-Level Outcomes Proved Significant

Implementation Outcome	Sample	Variance Explained
Perceived Benefits	All-Programs *Major Required Change*	42%
Change in Practice	All-Programs *Major Required Change*	49%
	Dissemination-Only *Major Required Change*	65%
	NDN *Major Required Change*	61%
Practice-Specific Mastery	All-Programs *Major Required Change*	50%
	NDN *Minor Required Change*	27%
Fidelity	All-Programs *Major Required Change*	53%
	Dissemination-Only *Major Required Change*	64%
	NDN *Major Required Change*	48%

Findings from the All-Programs Major Required Change Sample

Now we turn to the results of testing our model predicting individual-level outcomes on our All-Programs *major required change* sample. In a subsequent section, we present what we learned from comparing these findings with those from testing this model on our other samples.

Predictors of Outcomes of Implementation

We start with our ultimate outcome (perceived benefits) and work backwards. In Figure 5, we showed *perceived benefits* being predicted by three proximate implementation outcomes, as well as by seven other variables (or variable clusters). Unfortunately, we did not have enough resources to test our model using each separate proximate outcome of implementation as a predictor of perceived benefits. Accordingly, we decided to test the model as follows:

- once as shown in Figure 5, but with only one of the proximate implementation outcomes (plus perceived benefits); and
- twice as shown in Figure 2 (i.e., without perceived benefits), once each with the two remaining proximate implementation outcomes.

To decide which of the three proximate outcomes of implementation to include along with perceived benefits, we noted that the local development component of ESEA Title IV-C advocates neither *fidelity* nor *practice-specific mastery*. Furthermore, all four programs advocate inducing teachers to change their classroom activity. Accordingly, we selected *change in practice* to be tested as the predictor of *perceived benefits*. Figures 6 and 7 show this version of our model; the latter includes only individual-level variables.

Predictors of Perceived Benefits

As indicated earlier, the *individual-level variables only* version of the model predicting *perceived benefits* was significant when tested on the All-Programs *major required change* sample. As shown in Appendix A, this significance accrued primarily from three predictors: *change in practice*, *principal help received*, and *outside help*. Although the primary analysis for *site-level* variables predicting *perceived benefits* was not significant, *local facilitator help* turned out to be a significant (positive) predictor.

Since *principal*, *outside*, and *local facilitator help* all predict *perceived benefits* directly, we conducted some secondary analyses. When we combined *central office help* with both *local*

Figure 6: The Version of the Individually Focused Model Positing Change in Practice as a Direct Predictor of Perceived Benefits

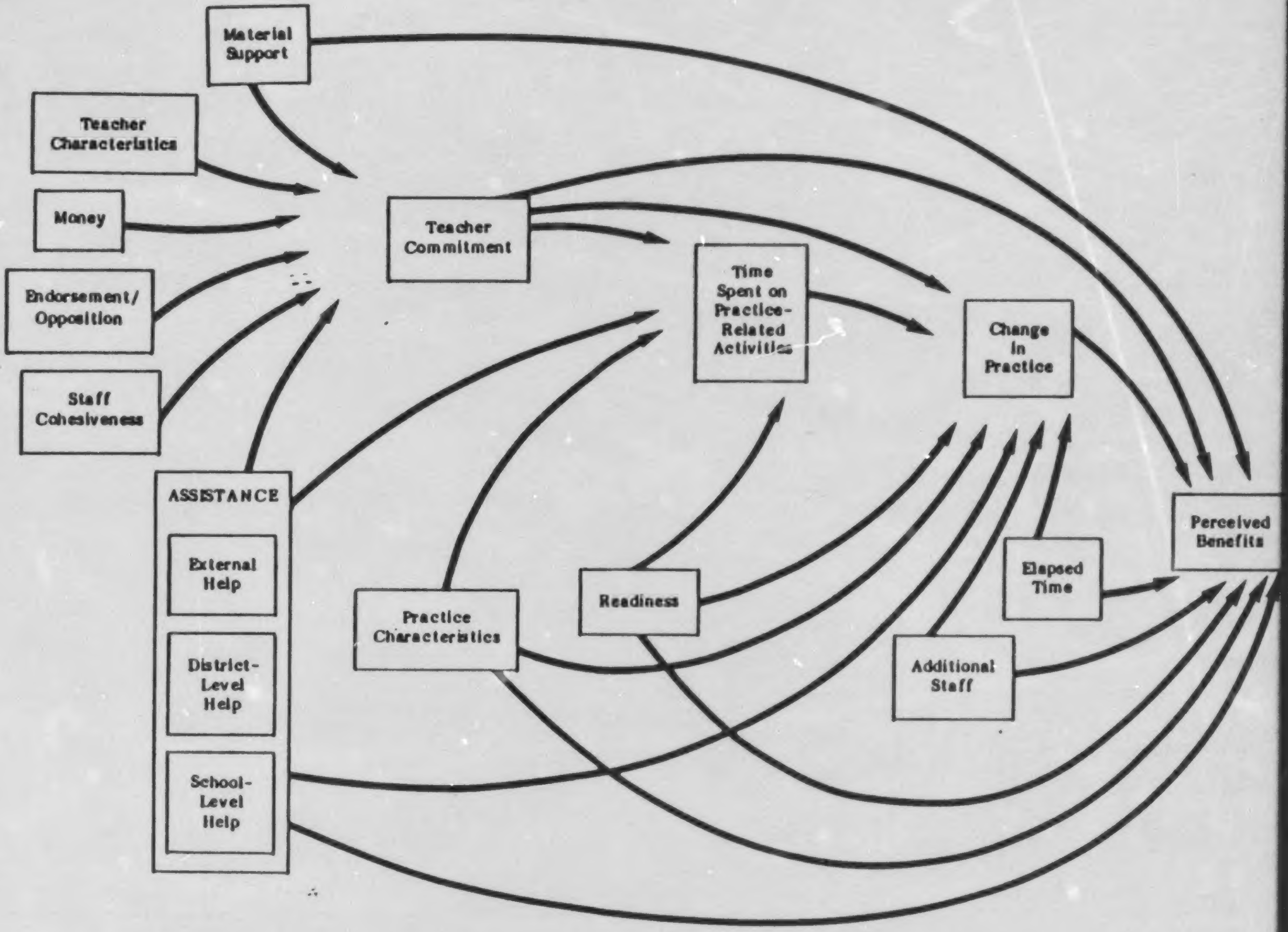
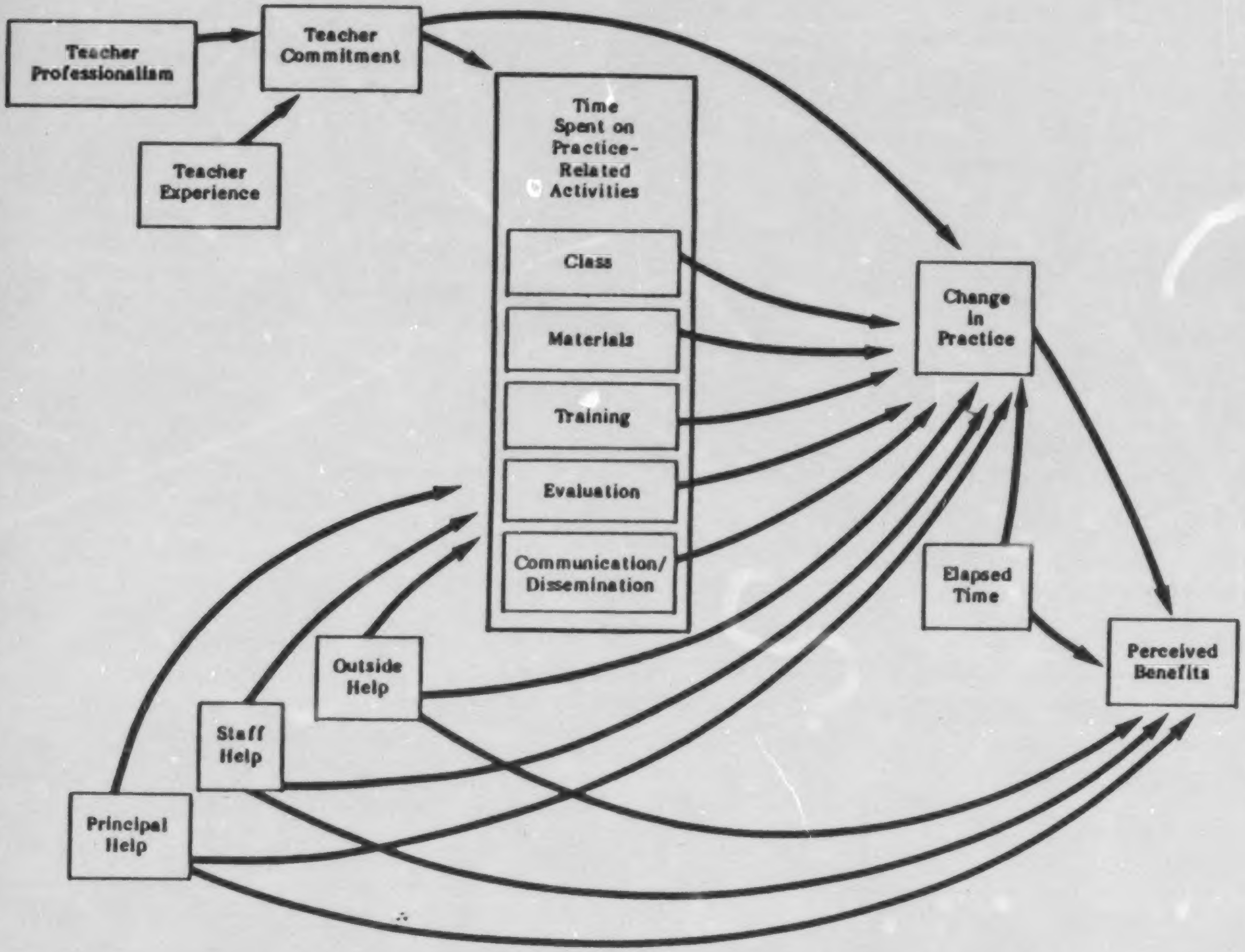

Material Support
Teacher Characteristics
Money
Endorsement/ Opposition
Staff Cohesiveness
ASSISTANCE
External Help
District-Level Help
School-Level Help
Teacher Commitment
Time Spent on Practice-Related Activities
Change in Practice
Practice Characteristics
Readiness
Elapsed Time
Additional Staff
Perceived Benefits

Figure 7: The Individual-Level-Variables-Only Version of the Individually Focused Model Positing Change in Practice as a Direct Predictor of Perceived Benefits


Teacher Professionalism
Teacher Commitment
Teacher Experience
Time Spent on Practice-Related Activities
Class
Materials
Training
Evaluation
Communication/ Dissemination
Change in Practice
Elapsed Time
Perceived Benefits
Outside Help
Staff Help
Principal Help

facilitator help and *external facilitator contact with administrators*, the results were highly significant ($p < .0008$, $R^2 = .49$). Surprisingly, both *central office help* and *external facilitator contact with administrators* were *negative* predictors of *perceived benefits*; *local facilitator help* variables were positive predictors.

Figure 8 displays the predictors we found of *perceived benefits*.

Predictors of Change in Practice

Although the *individual-level variables only* version of the model predicting *change in practice* proved to be statistically significant while the *site-level variables* version did not, all of the individual-level variables turned out *not* to be significant predictors of *change in practice* (See Appendix B), while three site-level variables *did*. Specifically, *readiness* and *help from local facilitators* turned out to be *positive* predictors while *help from external facilitators* turned out to be a *negative* predictor.

We conducted secondary analyses to shed light upon what aspects of *external facilitator help* were producing the negative effects and found two. One of these was *external facilitator contact with administrators*; items making up this variable are: seeking commitment from school administrators, seeking support from school boards, preparing a case for a decision to adopt the practice, and working with administrators. The second aspect of *external facilitator help* that proved to be a negative predictor of change in practice was *external facilitator teacher training*; items making up this variable are: arranging training and training teachers in the use of the practice.

Two more findings: *time spent on classroom use of the practice* turned out to have borderline significance[3] as a positive predictor of *change in practice*. On the other hand *time spent on materials* was a negative predictor, with borderline significance.

What are the predictors of *change in practice*? Our synthesis, which includes analyses not yet discussed, is displayed in Figure 9.

Predictors of Practice-Specific Mastery

The *individual-level variables only* version of the model predicting *practice-specific mastery* is depicted in Figure 10. As shown in Appendix C, only one variable was a significant predictor of *practice-specific mastery* (or Level of Use): *time spent on communicating about the practice*. Unfortunately, since communicating about the practice with others is a major criterion

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[3] Throughout this volume, whenever we use the phrase "borderline significance," we mean that $.05 < p < .10$.

Figure 8: Predictors of Perceived Benefits

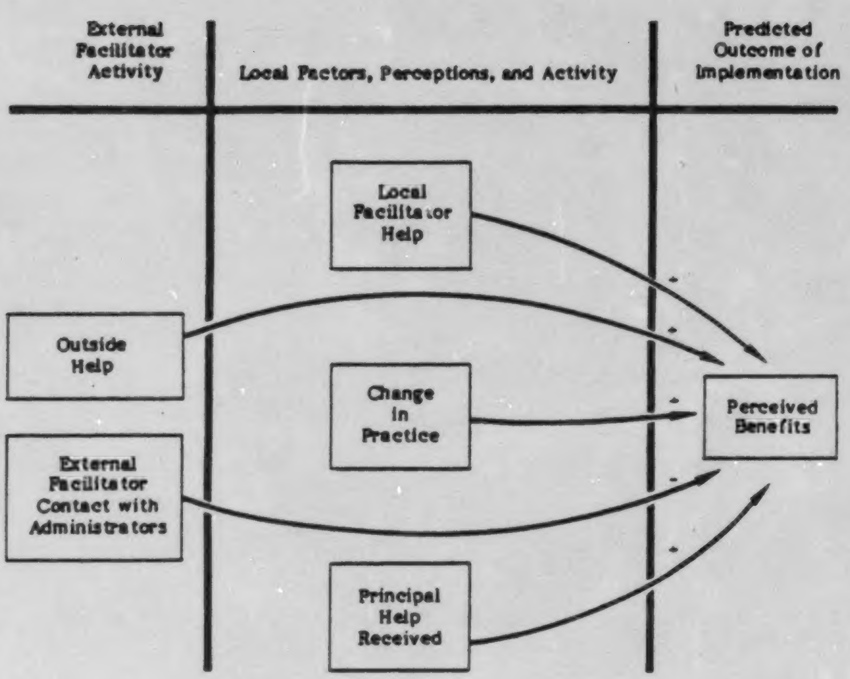

External Facilitator Activity
Local Factors, Perceptions, and Activity
Predicted Outcome of Implementation
Local Facilitator Help
Outside Help
Change in Practice
External Facilitator Contact with Administrators
Principal Help Received
Perceived Benefits
+
+
+
+
+

Figure 9: Predictors of Change in Practice

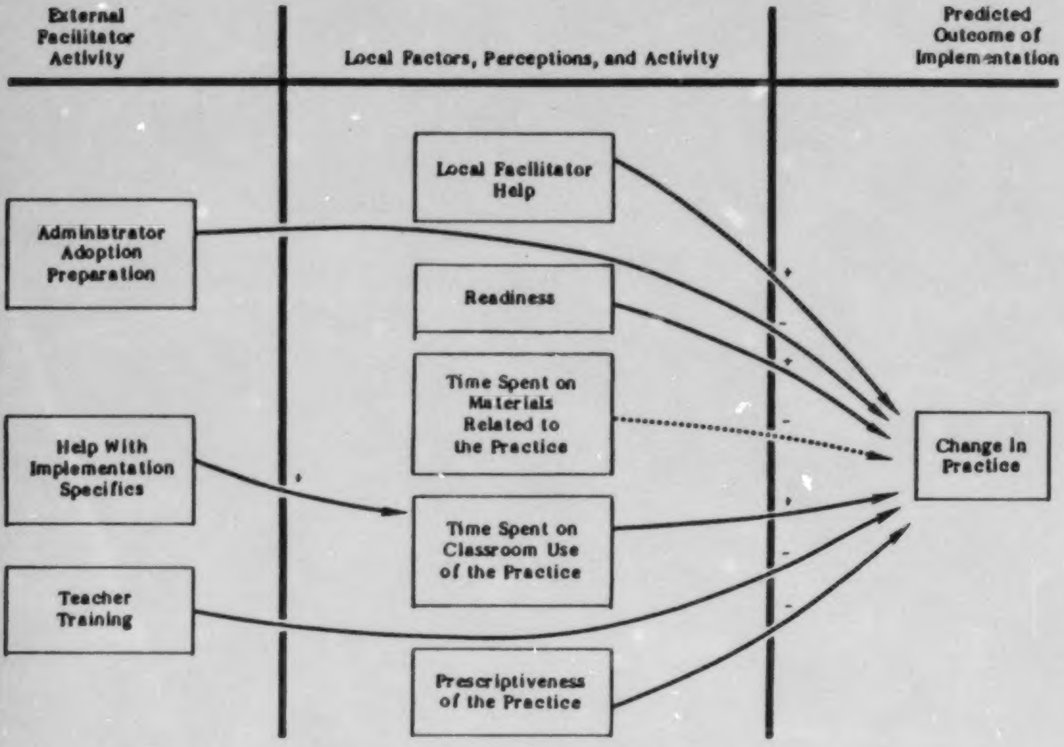
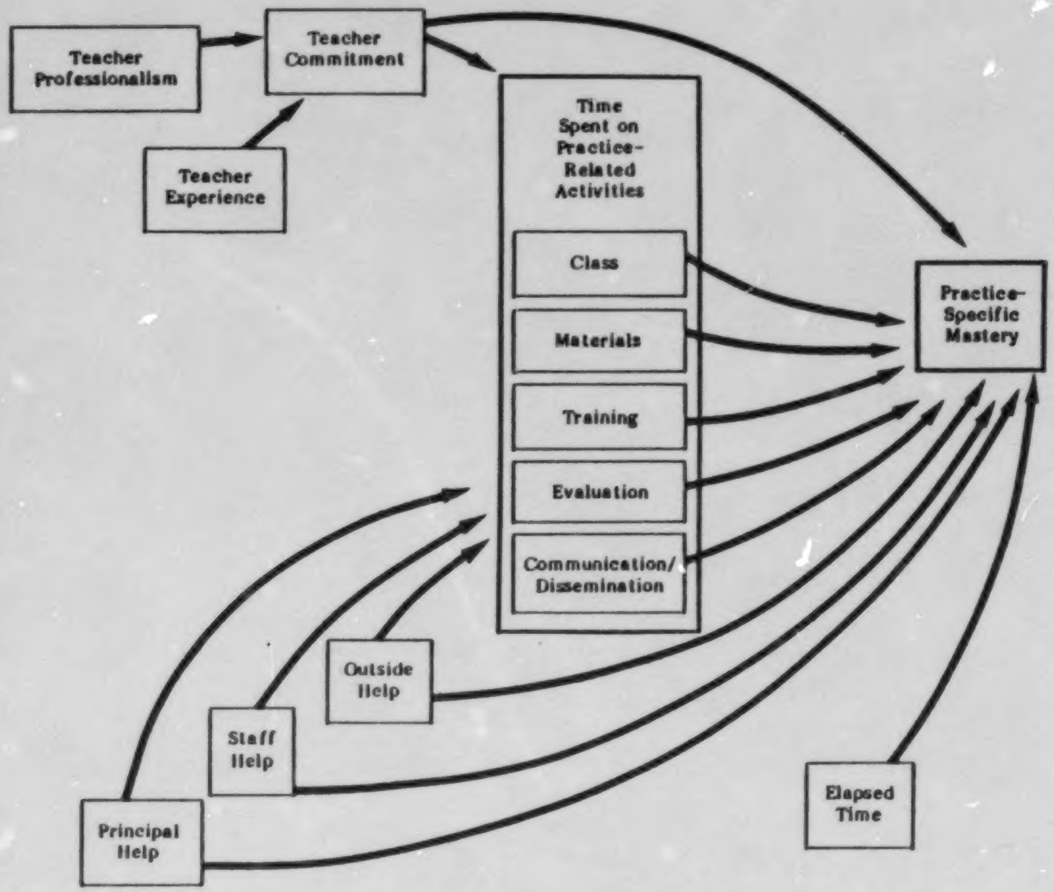

External Facilitator Activity
Local Factors, Perceptions, and Activity
Predicted Outcome of Implementation
Local Facilitator Help
Administrator Adoption Preparation
Readiness
Time Spent on Materials Related to the Practice
Help With Implementation Specifics
Time Spent on Classroom Use of the Practice
Teacher Training
Prescriptiveness of the Practice
Change in Practice
+
-
+
-
+
+
-
-

Figure 10: The Individual-Level-Variables-Only Version of the Individually Focused Model Predicting Practice-Specific Mastery


Teacher Professionalism
Teacher Commitment
Teacher Experience
Time Spent on Practice-Related Activities
Class
Materials
Training
Evaluation
Communication/ Dissemination
Practice-Specific Mastery
Outside Help
Staff Help
Principal Help
Elapsed Time

for obtaining a high practice-specific mastery score, the relationship between communicating about the practice and practice-specific mastery may be more tautological than predictive.

Time spent on materials related to the practice achieved borderline significance as a positive predictor of practice-specific mastery. Since teachers with high practice-specific mastery scores have begun to make minor (although acceptable) changes in the innovation, it is plausible that some of these changes stem from previewing, adapting, and/or making new materials. Again, the predictive ability of time spent on materials may be limited by definition.

Figure 11 displays our findings with respect to the predictors of practice-specific mastery.

Predictors of Fidelity

Figure 12 shows the individual-level variables only version of the model predicting fidelity, and Appendix D shows the path coefficients and standards errors for these predictors. Only one predictor achieved significance: principal help received. Also, time spent on classroom use of the practice had borderline significance as a positive predictor of this implementation outcome. These relationships are shown in Figure 13.

Predictors of Time Spent on Practice-Related Activities

As noted in our section on variables, we identified five different kinds of activities on which teachers spent their time. We have reported which kinds of activities had significant influence on outcomes. But what caused teachers to spend time on each kind of activity?

We tested a model to discover predictors of each kind of time spent on practice-related activities. We found few. None of the variables had significant impact on the time the teachers in the major required change group spent on materials, training for use of the practice, or communicating about the practice. Teacher commitment did, however, positively predict both time spent on classroom use and time spent on evaluation. Prescriptiveness of the practice had a borderline negative influence on time spent on evaluation.

We conducted some secondary analyses to discover the influence of various kinds of help on the three aspects of time spent on practice-related activities that appeared to predict our individual-level implementation outcomes. Although we were unable to find any kind of help that predicted time spent communicating about the practice, we discovered that external assistance on implementation specifics is a significant positive predictor of time spent on classroom use of the practice. In addition, we found external facilitator initial contact (including awareness activities) to be a borderline positive predictor of time spent on materials.

Figure 11: Predictors of Practice-Specific Mastery

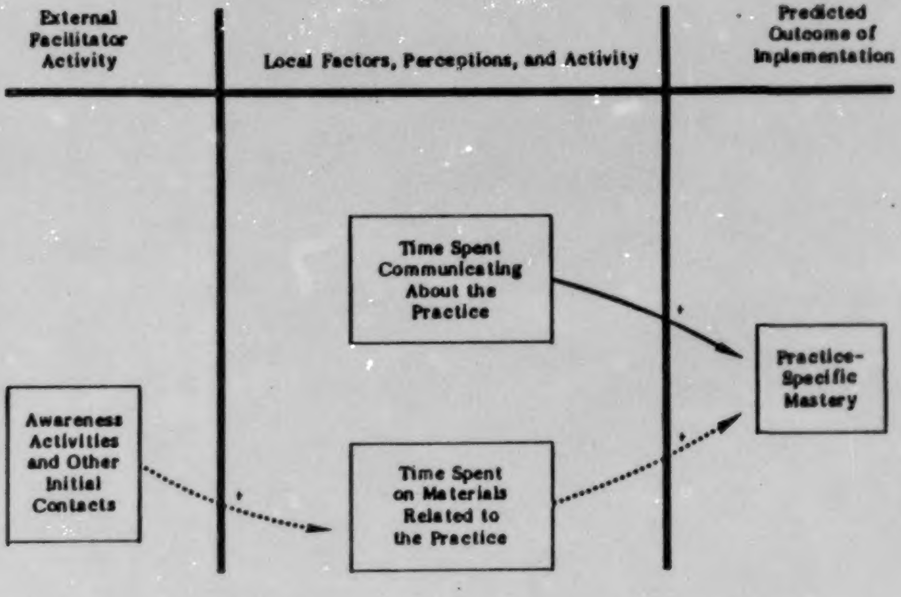

External Facilitator Activity
Local Factors, Perceptions, and Activity
Predicted Outcome of Implementation
Time Spent Communicating About the Practice
Practice-Specific Mastery
Awareness Activities and Other Initial Contacts
Time Spent on Materials Related to the Practice
+
+
+

Figure 12: The Individual-Level-Variables-Only Version of the Individually Focused Model Predicting Fidelity

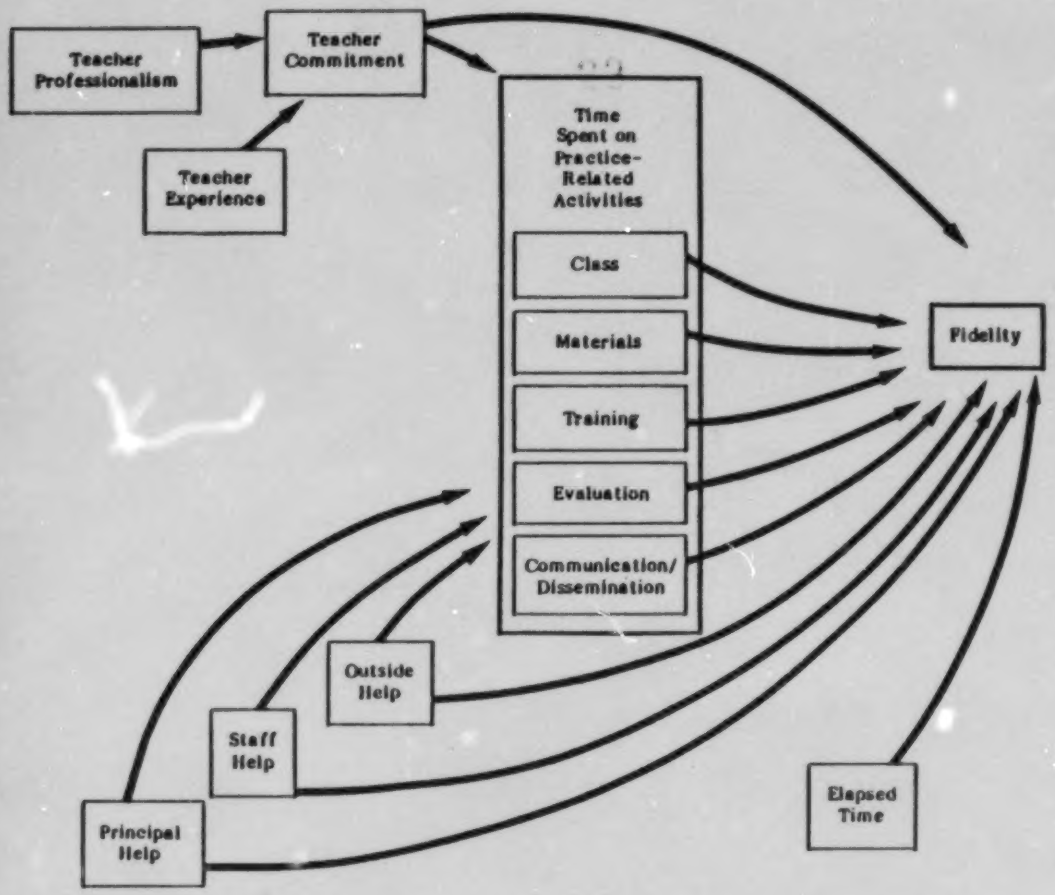
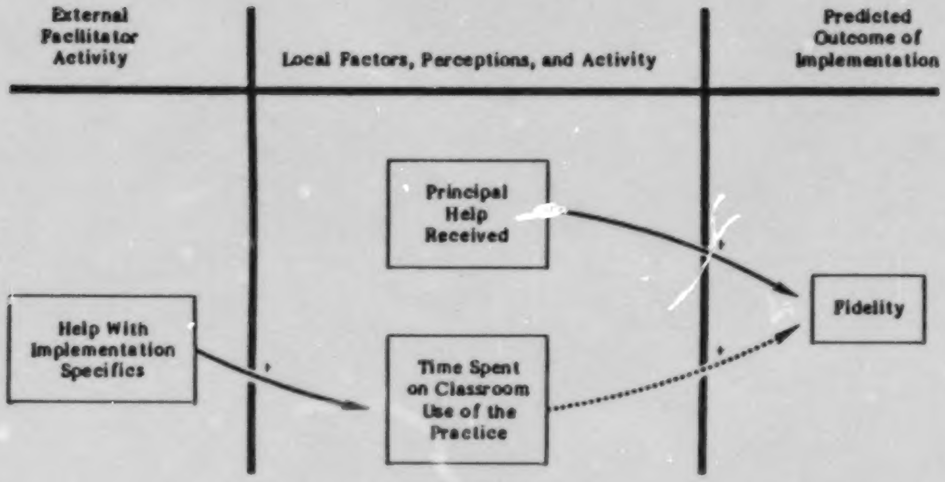

Teacher Professionalism
Teacher Commitment
Teacher Experience
Time Spent on Practice-Related Activities
Class
Materials
Training
Evaluation
Communication/ Dissemination
Fidelity
Outside Help
Staff Help
Principal Help
Elapsed Time

Figure 13: Predictors of Fidelity


External Facilitator Activity
Local Factors, Perceptions, and Activity
Predicted Outcome of Implementation
Principal Help Received
Help With Implementation Specifics
Time Spent on Classroom Use of the Practice
Fidelity
+
+
+

Synthesis: Predictors of Individual-Level Outcomes

Figure 14 shows our synthesis of the findings presented up to this point.

Cross-Sample Comparisons of Predictors of Implementation Outcomes

In this subsection, we first make comparisons within our major required change samples, and then compare our major required change samples to our minor required change samples.

Comparisons Within Our Major Required Change Sample

As explained above and displayed in Table 3, the teachers who were expected to make major changes are members of one or more of three concentric samples: The NDN sample of 42 teachers is wholly contained within and represents 68% of the Dissemination-Only sample of 62 teachers, which in turn is wholly contained within and represents 75% of the All-Programs sample.

Once again we point out that the smaller the size of the sample, the less confident we can be in the reliability of the findings. This is the reason why we concentrated in this chapter on our All-Programs sample. We now present the few relationships we found in our Dissemination-Only and NDN samples, starting with the Dissemination-Only sample.

Findings from Our Dissemination-Only Sample

In three instances, we found clear support for our All-Program findings:

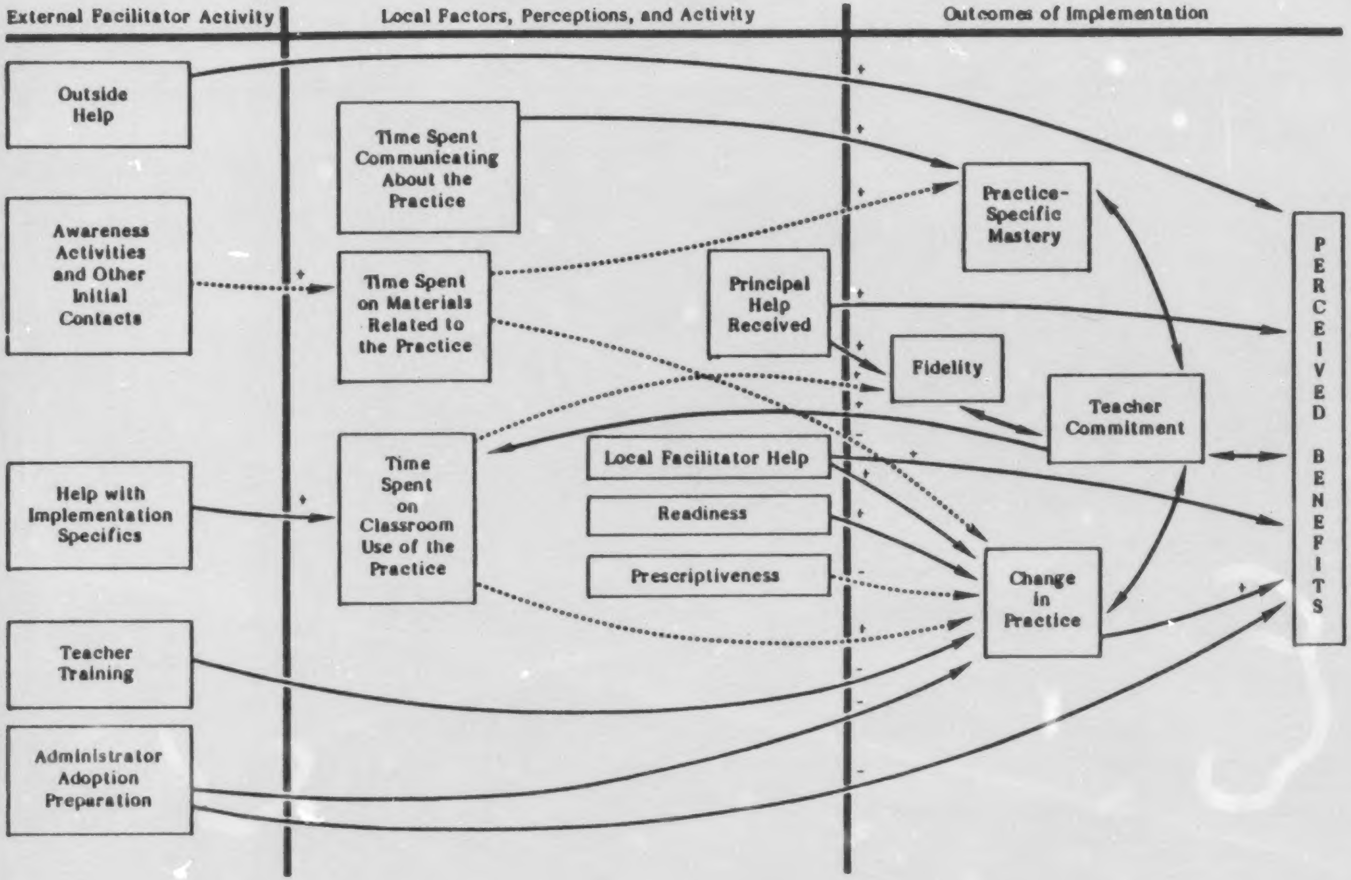
- in both the All-Programs and Dissemination-Only samples, outside help was a significant positive predictor of perceived benefits;

- in both samples, time spent on materials related to the practice was a positive predictor of practice-specific mastery, although in the All-Programs sample, this predictor only achieved borderline significance; and

- in both samples, principal help received achieved significance as a positive predictor of fidelity.

Our Dissemination-Only data analysis yielded two other significant relationships, both of which depart from the patterns we found in our All-Programs sample. The first is that help from within the staff turned out to be a significant negative predictor of practice-specific mastery. Not only does this finding depart from what we found in our All-Programs sample, but it also fails to square with what Huberman and Miles (1982) found in their longitudinal field study of a subsample of our sites. They found

Figure 14: Synthesis A: Predictors of Individual-Level Outcomes



External Facilitator Activity
Local Factors, Perceptions, and Activity
Outcomes of Implementation
Outside Help
Awareness Activities and Other Initial Contacts
Help with Implementation Specifics
Teacher Training
Administrator Adoption Preparation
Time Spent Communicating About the Practice
Time Spent on Materials Related to the Practice
Time Spent on Classroom Use of the Practice
Principal Help Received
Local Facilitator Help
Readiness
Prescriptiveness
Practice-Specific Mastery
Fidelity
Teacher Commitment
Change in Practice
PERCEIVED BENEFITS
+
-

that staff help contributed to mastery. Possibly our finding here is spurious, one of those false positive relationships obtained purely by chance. However, if we were pressed to treat it as real, our response would be to note that staff help exerts its influence in conjunction with time spent on materials related to the practice. It is possible that in order to achieve practice-specific mastery, teachers must roll up their sleeves and grapple with practice-related materials. Coordinating such work with colleagues may induce such a motivation (hence the positive relationships, first between staff help and time on materials, and then between time on materials and practice-specific mastery). But if they spend time on materials with other staff (as opposed to on their own) the social aspects of group work dominate the activity to the detriment of the practice-mastery aspects (thus the negative direct relationship between staff help and practice-specific mastery). An alternate interpretation is that the more expert the teachers become, the less help they need (and get) from other staff.

The other Dissemination-Only significant finding that departed from our All-Programs findings was that teacher commitment turned out to be a positive predictor of change in practice. Since this same variable was a significant positive predictor of three implementation outcomes in our NDN sample -- viz., change in practice, practice-specific mastery, and fidelity -- we now shift to a discussion that focuses not on the nature of the sample, but rather on the relationship of teacher commitment to these implementation outcomes.

Teacher Commitment as a Predictor

We have accepted the conclusion of Huberman and Miles (1982), who conducted the longitudinal field study component of the study with a subsample of our survey sites. They found that at least sometimes, rather than being a cause of extended implementation activity, teacher commitment is an effect. While this conclusion may surprise some, it is quite compatible with the empirically demonstrated generalization that attitudes frequently grow out of actions rather than the other way around.

Although we did not find any predictors of teacher commitment in our individually focused model, we did find some when we tested our school-focused model. Furthermore, as a result of arriving at the conclusion just stated, we treated teacher commitment as an implementation outcome in that model. Consequently, in the diagrams that appear in the remainder of this volume, if we are presenting findings related to our individually focused model, we show teacher commitment involved in bi-directional relationships; when we present findings related to our school-focused model, we show it involved solely as an outcome of implementation.

Other Findings from Our NDN Sample

In three instances, our NDN findings solidly support our All-Programs findings. Specifically, in both samples:

- outside help was a significant positive predictor of perceived benefits;
- principal help received was a significant positive predictor of perceived benefits; and
- time spent communicating about the practice was a significant positive predictor of practice-specific mastery.

A fourth finding is also somewhat supportive: help from within the staff is a significant positive predictor of change in practice. It was reassuring to find the same variable that was a significant negative predictor (of practice-specific mastery) in the Dissemination-Only sample turning out to be a significant positive predictor (of a different implementation outcome) in the NDN sample. It reinforces our confidence in the importance of help, at least for change in practice.

Our analysis of the NDN data yielded two other relationships:

- time spent evaluating the practice was a significant negative predictor of practice-specific mastery; and
- elapsed time turned out to be a significant negative predictor of fidelity, meaning that for NDN practices, as time passes, fidelity fades.

What Did We Learn From Testing Our Model on Samples Composed of Different Combinations of School Improvement Strategies?

Our primary objectives in testing our model on not only the All-Programs sample but also the Dissemination-Only and NDN samples were:

- to determine the validity of our assumption that for major required change teachers, relationships between predictor variables and implementation outcomes hold across school improvement strategies; and
- to identify patterns of assistance that predict our outcomes of implementation.

These objectives may at first appear to be based upon conflicting assumptions about the extent to which teachers undergo similar experiences when trying to implement innovations in connection with various school improvement strategies. Our experience, however, denies this for several reasons.

First, as we compare the experiences of teachers across the programs that we studied, the experiences *were* similar. Since this position may appear surprising, let us look at those features of the programs in our sample that should provide techers with *different* experiences. The programs that should provide techers with the largest disparity in experience are the NDN and the local development component of Title IV-C. Since the practices that NDN teachers were implementing came from *outside* their districts, while those that IV-C teachers were implementing came from *within* their districts, one might expect that compared to our NDN teachers, our IV-C teachers would be

- less likely to feel that something alien was being imposed upon them;
- more likely to perceive that the innovation fit their local context; and
- less likely to receive implementation assistance.

However, even though the practices that IV-C teachers were implementing had been developed within the district, we learned that the teachers in our sample were not the *developers* of these practices. They were instead *at the receiving end* of an internal dissemination effort. The practice that was being disseminated was frequently developed in another school. Thus for *both* IV-C and NDN teachers, the practice was alien; the extent of imposition depended not upon the federal program providing the funds, but upon the decisions of local administrators.

Turning now to the issue of context-practice fit, when school personnel made decisions to adopt NDN practices, they usually did so *because* the practice was alleged to meet a district need or priority. In addition, since the decision-makers usually made their selection from several options designed to meet similar needs, their decisions most likely reflected, among other things, their efforts to take contextual factors into account.

Furthermore, *within*-district variation in the student population being served often exceeds *between*-district variation on such dimensions as *family income* and *parent education*. This means that if a practice fits perfectly into one school in a district, there is little guarantee that it will fit adequately into others (especially in large districts).

Finally, the bulk of assistance received by teachers from NDN personel is usually provided at the outset -- e.g., awareness conferences and initial training -- and this same kind of assistance is often provided to IV-C teachers. Whether additional assistance is provided again depends less upon the policies of the sponsoring federal program, and more on the decisions of local administrators.

In other words, compared to our NDN teachers, our IV-C teachers were just as likely both to perceive the practice as an alien imposition, and to face context-practice fit problems; furthermore, they had a good chance to receive similar types and amounts of assistance.

Does the above imply that there are no differences among schools with respect to the patterns of assistance teachers receive? To study this question, we identified nine categories of external facilitator assistance (see Section 2 of Chapters IV and V) and several categories of local facilitator assistance. Although we found some differences in amounts of each category of assistance between programs, we found greater differences within programs. Thus to study which patterns of assistance predict our implementation outcomes, we did not compare programs, we compared categories of assistance.

In sum:

- from program to program, teachers had generally equivalent implementation experiences;
- the teachers in our sample differed from each other with respect to the assistance they received; and
- we can evaluate school improvement strategies by examining the extent to which they encourage the kinds of assistance that are associated with favorable implementation outcomes.

All in all, then, our dual objectives -- determining whether our assumption is valid and identifying patterns of assistance associated with favorable implementation outcomes -- are quite compatible.

Is our assumption about stable relationships valid? With respect to our cross-sample findings, the following generalizations appear to hold for the major required change teachers:

- Compared to the All-Programs sample, the Dissemination-Only and NDN samples yielded fewer significant and borderline significant findings.
- Most of the Dissemination-Only and NDN findings support the All-Programs findings.
- None of the few findings that were unique to the Dissemination-Only and NDN samples were incompatible with those obtained from our All-Programs sample.

Accordingly, we conclude that for our major required change teachers, the relationships among the variables that we studied appear to remain stable across school improvement strategies.

What patterns of assistance appear to work? We articulate this question here for the sake of completeness. We answer it in Chapters III, VII, and VIII.

Comparisons Between Our Major Required Change and Minor Required Change Samples

As indicated above, the model never achieved significance on any test of predictors of implementation outcomes when we used our All-Programs *minor required change* sample. The only relationship that achieved statistical significance was of *elapsed time* as a positive predictor of *change in practice*, meaning that as time goes by, the teacher's instructional practice undergoes progressively more change.

There are several borderline significant relationships for the *minor required change* sample that together tell a coherent story:

- *time spent on training* is a positive predictor of *perceived benefits,* and *external facilitator assistance on training* is a significant positive predictor of *time spent on training*;
- *outside help* is a *negative* predictor of *change in practice*; and
- *readiness* is a *negative* predictor of both *practice-specific mastery* and *change in practice*.

The negative relationship between *readiness* and *change in practice* is probably an artifact of the sample and the variable definition. Prior to implementation, the teachers confronting the need to make only minor changes were already engaged in practices similar to the innovation. High scores on *readiness* indicate the availability of skills, motivation, and resources in the school to implement the new practice. The more skills, resources, and motivation a teacher already has who is doing something very close to the innovation, the less change is available (in order to be using the developer's ideal version).

Earlier we took the position that teachers must be confronted with the expectation that they make sufficiently large changes in their instructional practices before the process becomes somewhat predictable. This is still our position, given that none of our tests of the model on the All-Programs *minor required change* sample (which was our largest) proved significant, and given the borderline significance of all but one of the remaining findings. Whereas the conventional wisdom is that we should exercise caution in taking seriously the shadow of the process that we glimpsed, we cannot resist the temptation to articulate the portrait of the *minor required change* process that does emerge.

Generally, external facilitator training, which is usually short and sweet, "front-end" training, is sufficient for teachers who are already using practices very similar to a new one. If left alone after the training, the teacher will gradually make changes and experience benefits. However, for teachers confronted with the need to make larger changes, such front-end external facilitator training and/or external facilitator time spent negotiating arrangements with administrators have negative impact upon outcomes. These teachers facing major changes need helpers who are there most of the time, giving on-going assistance. The principal and the local facilitator make a constructive contribution to the process. External facilitators appear to be helpful only when they concentrate their energies upon the specifics of implementing the practice.

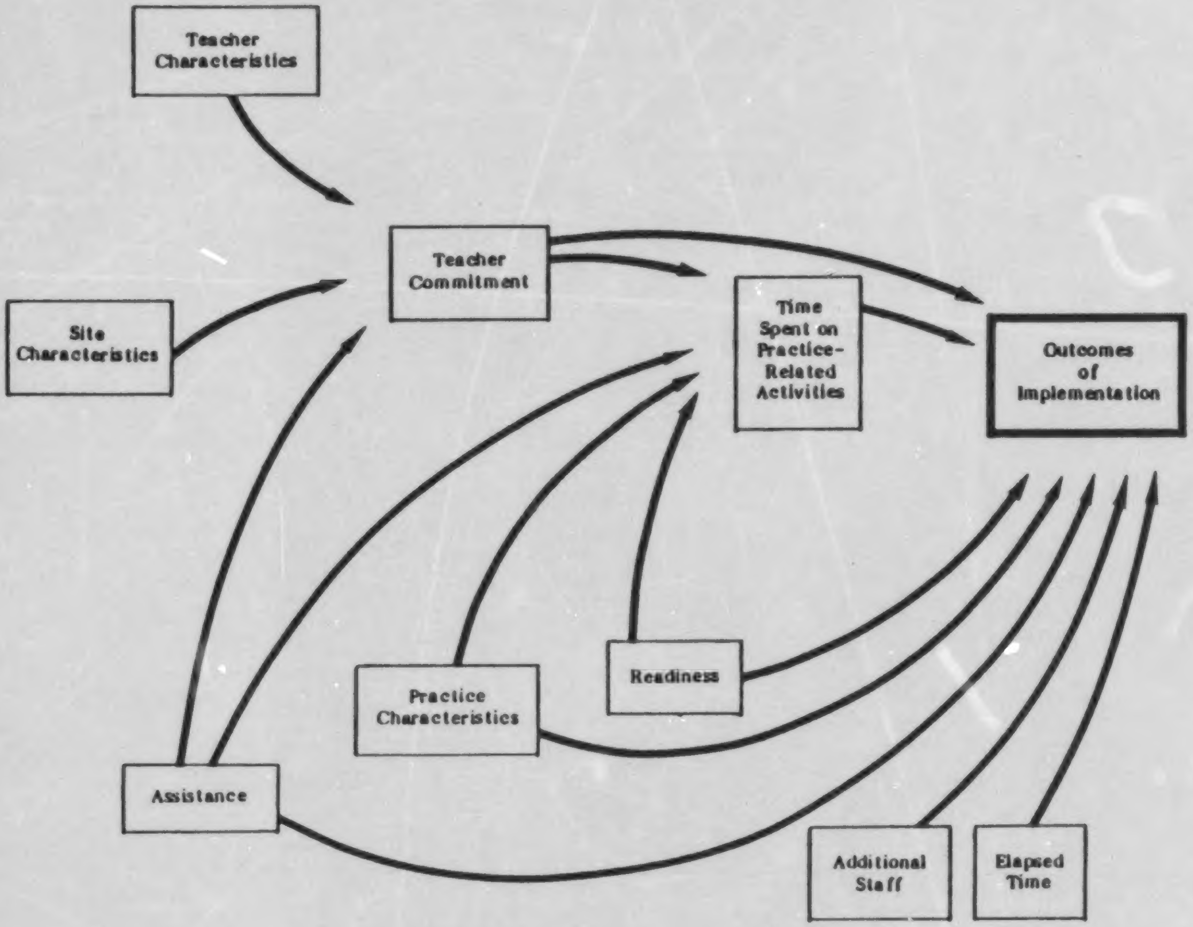
On the other hand, all the front-end training and administrator adoption preparation that distracted the external facilitator from what should have been done with teachers confronting major changes, is just what teachers want if they are already using most of the components of the practice. They need someone who will provide them with a coherent overview and detailed walk-through once, and then leave them alone. They benefit from having the external facilitator keep the administrators out of their hair. They do not really need either principal or local facilitator assistance.

Implications of the Findings for Our Conceptual Scheme

Let us step back from examining the fate of specific predictions to focus upon the viability of our initial conceptual scheme, which is presented in Figure 15 (a simplified version of Figure 2). Although we hypothesized that assistance, teacher commitment, readiness, and practice characteristics would all predict our implementation outcomes directly, a key premise of the model was that each of these variables would predict time spent on the practice-related activities which in turn would predict our outcomes of implementation. Some of these and other hypotheses shown in Figure 15 were not supported at all, specifically:

- teacher commitment was predicted by neither teacher characteristics, miscellaneous site characteristics, nor assistance;
- readiness did not predict time spent on practice-related activities; and
- additional staff did not predict the outcomes of implementation.

Figure 15: The Conceptual Scheme Underlying the Model Predicting Individual-Level Outcomes


Teacher Characteristics
Teacher Commitment
Site Characteristics
Time Spent on Practice-Related Activities
Outcomes of Implementation
Readiness
Practice Characteristics
Assistance
Additional Staff
Elapsed Time

Others were only supported weakly, specifically:

- *practice characteristics* and *assistance* were only borderline predictors of *time spent on practice-related activities*; and

- *practice characteristics* and *elapsed time* were only borderline predictors of our implementation outcomes. (Furthermore, whether *elapsed time* has a positive or negative influence upon our implementation outcomes appears to depend upon whether teachers are expected to make major or minor changes.)

One variable appeared to play an important role, but not exactly as we had anticipated. Specifically, we expected that *teacher commitment* would predict implementation outcomes, but we concluded that the influence is bidirectional. In other words, the more that implementation outcomes become visible, the greater the extent of teacher commitment, which in turn leads to more visible (and more favorable) implementation outcomes.

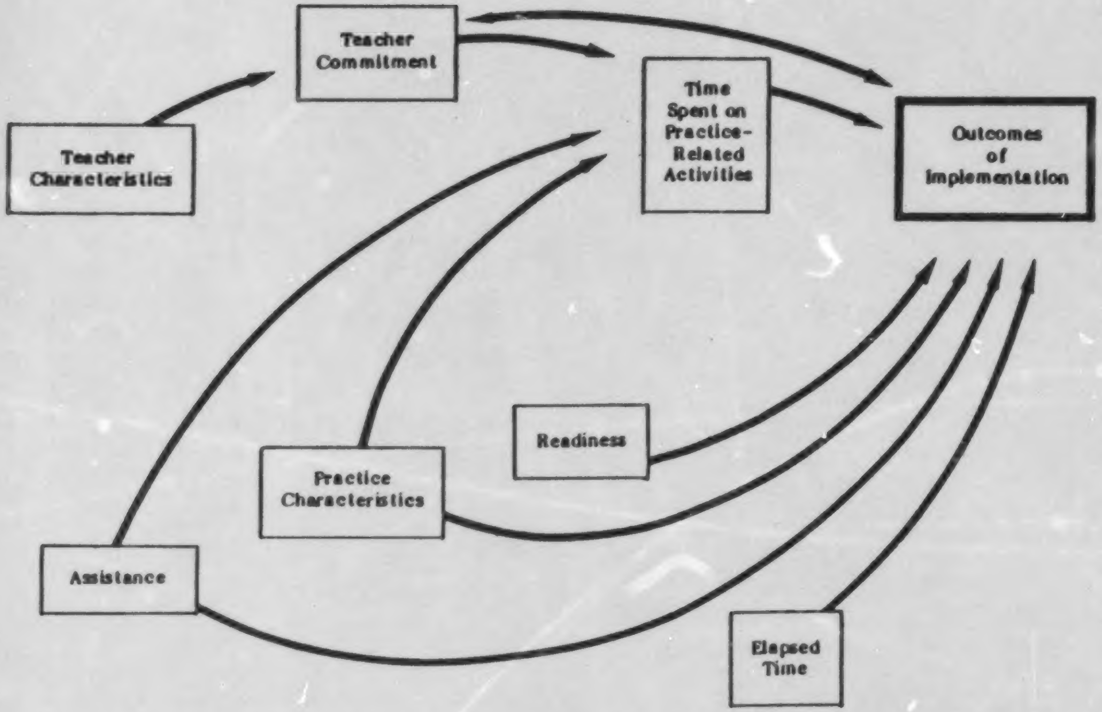
Finally, some of our hypotheses were strongly supported, specifically:

- teacher *commitment* is a significant predictor of *time spent on practice-related activities*; and

- *readiness*, *assistance*, and *time spent on practice-related activities* are all significant predictors of the outcomes of implementation.

Figure 16 shows how our conceptual scheme should be changed to conform to our findings (assuming that the lack of findings reflects a genuine lack of a relationship, as opposed to sampling or measurement problems).

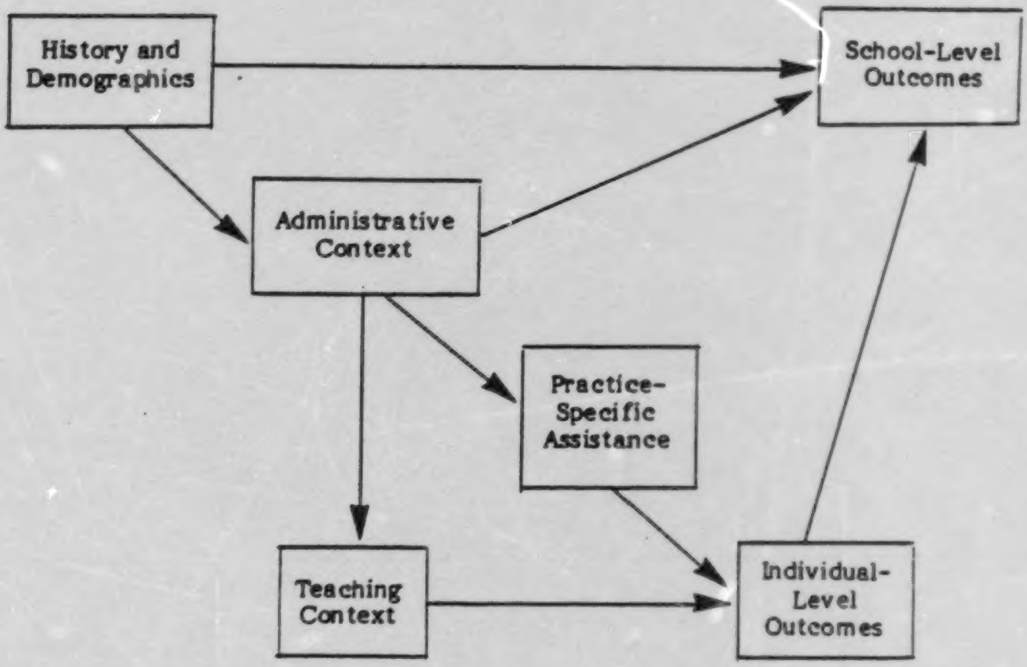
Figure 16: A Framework that Reflects Findings for a Model Predicting Individual-Level Outcomes


Teacher Commitment
Teacher Characteristics
Time Spent on Practice-Related Activities
Outcomes of Implementation
Readiness
Practice Characteristics
Assistance
Elapsed Time

CHAPTER II: PREDICTORS OF OUTCOMES OF IMPLEMENTATION AT THE BUILDING LEVEL

In addition to predicting outcomes at the individual level, we wanted to be able to predict outcomes at the building level. We presented our initial conceptualizations of the relationships among the predictors of school-level outcomes in Figure 3. We reproduce this overview here; the complete diagram of this model appears in Appendix I.

Figure 3: Initial Conceptualization of the Model Predicting School-Level Outcomes


History and Demographics
School-Level Outcomes
Administrative Context
Practice-Specific Assistance
Teaching Context
Individual-Level Outcomes

As we indicated in our introduction, we hypothesized

- that school-level outcomes would be predicted by three factors: history and demographics, administrative context, and individual outcomes; and
- that administrative context would predict practice-specific assistance and teaching context, which together would predict individual outcomes.

A key point in this conceptualization was our assumption that one route to school-level outcomes was through individual outcomes. More specifically, we assumed that teachers mastering a new practice and/or deriving benefits from its use would predict both organizational change and the institutionalization of the new practice. However, when we tested our first version of this model, we did not find support for this assumption, although we did find support for some of our initial notions. (The regression coefficients and standard errors for this version of the school-focused model are contained in Appendix J.)

Specifically, we found:

- that individual outcomes did not predict school-level outcomes;
- that school-level outcomes were predicted not only by both demographics (although not history) and administrative context, but also by practice-specific assistance;
- that administrative context did not predict teaching context but demographics (although not history) did; and
- that many variables in the first version of the model did not predict what we thought they would, and some variables predicted others that we did not predict.

Accordingly, we dropped the following variables:

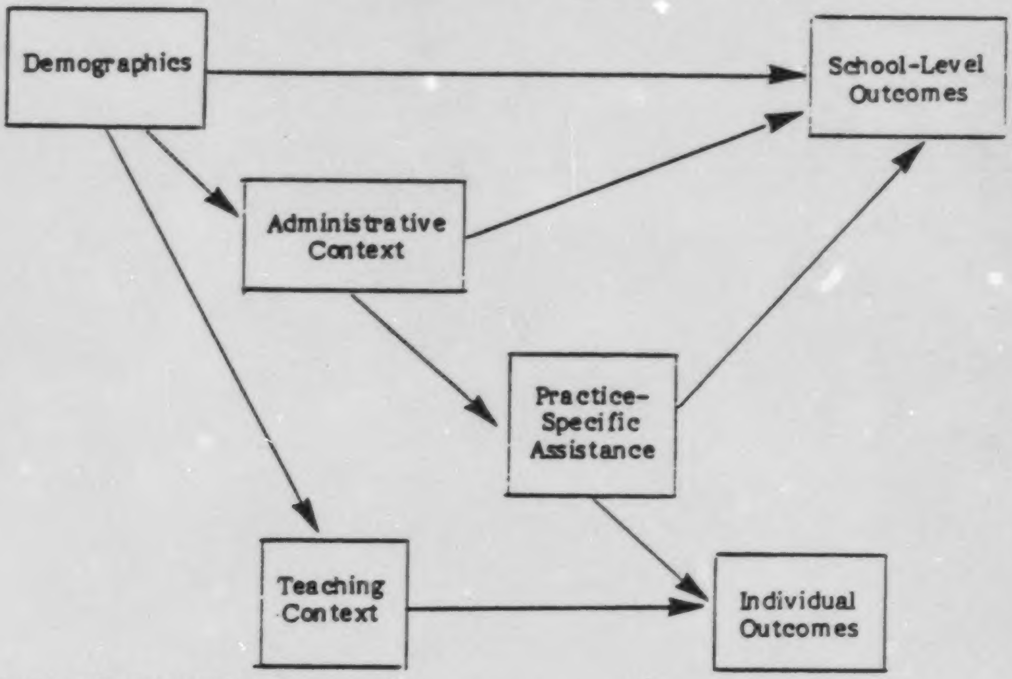
- per pupil expenditure,
- school improvement history,
- central office power,
- central office responsiveness to teachers,
- student impact,
- central office management style, and
- teacher autonomy.

We then reconceptualized the model predicting school-focused outcomes as shown in Figure 17; the complete diagram of this revised model is in Appendix K.

Section 1: The Variables

The variables contained in the school-focused model appear below, grouped together functionally; those that are preceded by an asterisk were also in the individually focused model, and therefore have already been described in Chapter I, Section 1.

Figure 17: Revised Conceptualization of the Model Predicting School-Level Outcomes


Demographics
School-Level Outcomes
Administrative Context
Practice-Specific Assistance
Teaching Context
Individual Outcomes

School-Level Outcomes

- Institutionalization: the degree to which the practice had become a regular aspect of school life that was not dependent upon present personnel.

- Plans for continuation: the likelihood that use of the practice would be eliminated, reduced, maintained, or expanded.

- Organizational change: benefits of the practice that impacted more broadly than on individual students or teachers (e.g., better teacher-staff relations, more skilled staff).

Demographics. These variables characterize the school buildings or districts in which the implementation of the practice took place.

- Number of students in the district.

- Number of teachers in the school.

Administrative Context. These variables characterize the leadership and management style of both the district and building administrations. They are perceived generally by the faculty and in terms of the specific practice by users.

- Administrative power over the implementation: whether administrators were decision-makers in the adoption process and/or had a role in controlling the implementation.

- Principal leadership: the degree to which the principal actively focused the direction of activity in the school building. [This measure is a replication of items used in the /I/D/E/A/ Study of Educational Change and School Improvement (Bentzen, 1974).]

- Principal management style: the teachers' perceptions of how the principal responded to their concerns and communicated with them.

- Principal commitment to the practice: the degree to which the principal felt personally involved with, and critical to, the implementation effort.

- *Readiness.

Teaching Context. Thee variables describe the general disposition of the faculty towards problems and colleagues. They also characterize the modal user's disposition toward the practice and role in its implementation.

- Faculty attitude toward school improvement: the opinion expressed by building faculty that the level of school improvement activity should be lowered, maintained, or increased.

- Teacher control over implementation of the practice: the modal user's assessment of his or her influence on decisions affecting project implementation, and ability to surmount obstacles in the course of implementation.

- Problem-solving effectiveness: the conduciveness of the environment to routine, systematic, action-oriented problem-solving, as indicted by the extent to which faculty agreed that procedures existed for dealing with problems, that decisions were made by people possessing adequate and accurate information, and that decisions once made, carried clear action implications [This measure is a replication of items used in the /I/D/E/A/ Study of Educational Change and School Improvement (Bentzen, 1974)].

- Staff rapport: the amount of cooperation and the tolerance for differing opinions among the staff.

- *Teacher commitment.

Practice-Specific Assistance. These variables measure the help teachers were given in implementing the practice.

- *External facilitator help.

- *Local facilitator help.

- *School level help.

- *Principal help received.

Individual Outcomes. These variables measure outcomes of the implementation that were experienced by individual teachers. They are conceptually related to but different from the outcomes that were predicted in the individually focused model.

- Practice-related mastery: a measure (Level of Use) of the user's relative facility with whatever variation of the practice he or she was employing, unconstrained by the developer's stipulations of which components were required and which variations were acceptable.

- Practice as problem solution: a report by users of the extent to which the new practice solved problems with which they had been grappling for some time.

- Teacher rewards: the number of benefits reported by users that accrued to them as individuals (versus those associated with student gains).

- Net evaluation of the practice: the number of gains that users reported to result from the implementation of the practice minus the number of losses so reported.

- Advantages vs. disadvantages of the practice: the number of advantages of the practice that users mentioned minus the number of disadvantages so mentioned.

Section 2: The Findings

Analyses were run on all 82 schools on which we had complete sets of data, regardless of whether teachers were expected to make major or minor changes. The model as a whole proved highly significant ($p < .001$). Unfortunately, few of the hypothesized relationships between predictor and predicted variables and school-focused outcomes turned out to be significant (see Appendix L). Below, we describe the predictors of school-focused outcomes[4]; then we discuss some relationships in the model that turned out to be significant or interesting.

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[4] Appendix L lists all of the relationships that achieved significance and borderline significance. Here we describe all the significant relationships, and those reaching borderline significance that we judged to have useful implications for practice or policy. The remaining relationships with borderline significance can be found in the Appendix.

Predictors of School-Level Outcomes

Predictors of Institutionalizaton and Plans for Continuation

None of the relationships were significant between predictor variables and either plans for continuation or institutionalization. Three relationships between predictor variables and plans for continuation achieved borderline significance. One relationship was opposite to what we believed; specifically, teacher rewards was negatively related to plans for continuation. The other two variables that had borderline significance with plans for continuation, in this case, positive, were principal commitment and principal leadership. In addition, the relationship between organizational change and institutionalization achieved borderline significance.

Both plans for continuation and institutionalization are variables that attempt to predict the durability of the implemented practice; in short, we wanted to know how long the school would continue to use it. The two measures differ in that the former is based on relatively vague and intangible indicators whereas the latter points to concrete actions the school or district has taken. Why didn't our predictions regarding the innovation's durability achieve adequate support?

Our field study findings suggest one answer. Huberman and Miles (1982) discovered that an innovation's durability was not especially connected with how well the practice worked. For example, they found practices discontinued that had been both implemented successfully and perceived by system members as effective. Reasons for discontinuation included such hard-to-control factors as major changes in the school or district's overall budget, and movement of key advocates of the practice out of their positions; in fact not infrequently, such movement was upward mobility that, at least in part, resulted from their role in implementing the practice!

Predictors of Organizational Change

While our results and those of Huberman and Miles suggest that plans for continuation and institutionalization are only weakly related to the success of implementation efforts, one would expect organizational change to be predictable by the factors in our model. At first glance, our findings on this point appear mixed; on balance they are rather reassuring. Two relationships were firm: external facilitator assistance proved to be a significant positive predictor of organizational change, and principal leadership had borderline significance as a positive predictor.

What confused us was a significant but negative relationship between the predictor variable faculty attitude toward school improvement and organizational change. A re-examination of the definition of this predictor -- the opinion expressed by building faculty that the level of school improvement activity should be lowered, maintained, or increased -- prompted us to wonder whether *faculty attitude toward school improvement* might be predicted *by* the outcome *organizational change*, rather than its *predictor*.

An example may clarify our current interpretation. Let us assume that an innovation has been adopted to solve a problem that exists in a school. If implementing the innovation *fails* to bring about the desired organizational changes, the problem will remain unsolved and the faculty may conclude "that the level of school improvement activity should be . . . increased." On the other hand, if implementing the innovation *succeeds* in bringing about the desired organizational changes, *not only* will the problem have been solved, but also the faculty may seek a hiatus from further school improvement activity so that these changes can stabilize. Given that it takes two or three years to achieve such stabilization [e.g., see Huberman and Miles (1982) and Fullan (1982)], such a faculty sentiment appears well-advised.

Other Significant or Interesting Relationships

Below, we first report the predictors of *teacher commitment*, then those of *principal help received*. Finally, we discuss an intriguing finding regarding the way in which the number of teachers in a school affects a principal's activity.

Predictors of Teacher Commitment

In Chapter I, we set forth our conclusion that *teacher commitment* was cyclically related to some of the outcomes it was supposed to predict in the individually focused model, and indicated that we would treat it as an outcome-to-be-predicted here. When we tested for predictors of *teacher commitment* as displayed in Appendix F, two out of three turned out to be significant: *teacher control over implementation* and *local facilitator help*.

Predictors of Principal Help Received

We were puzzled when we first discovered that *principal management style* was a significant *negative* predictor of *principal help received*. Since both of these variables are measures of teachers' *perceptions* of principal activity, this finding means that the *more* principals appeared to be engaging in such activities as soliciting opinions from teachers, rewarding initiative, and providing constructive feedback, the *less* help teachers perceived them to be giving with the practice. Before commenting on this finding, we need to point out that 93% of the principals in our study were rated as engaging in such activities *with at least moderate frequency*; thus we are not claiming that principals were considered helpful who were reported as *rarely* engaging in these activities.

One interpretation of this finding involves differentiating a principal's typical style of working with the school faculty, and the amount of help that principal gives to a faculty implementing a *specific* practice. A principal who stays in tune with teachers' needs and activities may be more apt to arrange for others (e.g., other teachers or central office staff) to help when problems or issues arise around a specific practice. The close contact and monitoring makes the principal a better broker of help, although he or she may not deliver it directly.

Another interpretation of the negative relationship between *principal help received* and *principal management style* is that principals who get involved with a practice in concrete ways (e.g., providing materials, training teachers) may be viewed as pushing the practice. Teachers may perceive these principals as less responsive to their ideas, and more directive. Such a principal would have a lower score on *management style*.

There were two other variables in our model that turned out to have borderline significance as positive predictors of *principal help received*: *principal commitment to the practice* and *problem-solving effectiveness*. It appears that principals who *do* give teachers a lot of help with the practice also report a great deal of commitment to it. Theirs are schools where problems are handled systematically and smoothly. These findings suggest a difference between principals who are more task- or action-oriented (these are more apt to help directly with a new practice) and others who are more people-oriented (more apt to arrange for help from others).

The Effect on Principal Activity of Teaching Staff Size

We were fascinated to discover that the *number of teachers in the school* was a significant *positive* predictor of *principal leadership* and a significant *negative* predictor of *principal commitment to the practice*. In other words, as schools get large, principal leadership increases, while the principal's commitment to a particular new practice declines. It does seem sensible that as a school gets larger, the principal's awareness of any particular practice, let alone commitment to it, would decrease. Instead of focusing on particular practices, principals of large schools are more likely to concentrate their energies on maintaining the general direction of the school.

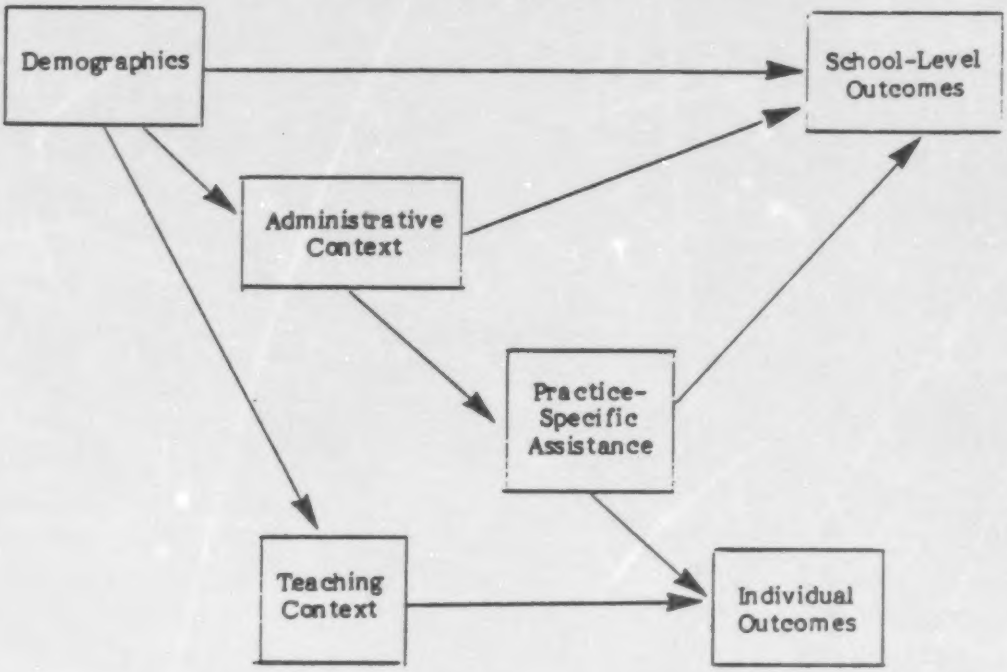
Synthesis of Our School-Level Findings

Figure 18 synthesizes the findings presented in this chapter.

Implications of the Findings for the Revised Conceptual Scheme

Again, let us step back from examining the fate of specific predictions to focus upon the viability of our revised conceptual scheme (recall that our preliminary analysis prompted us to revise our initial conceptual scheme). This scheme was originally presented in Figure 17, and is now reproduced on the following page. In essence, we hypothesized that school-level outcomes

Figure 17: Revised Conceptualization of the Model Predicting School-Level Outcomes

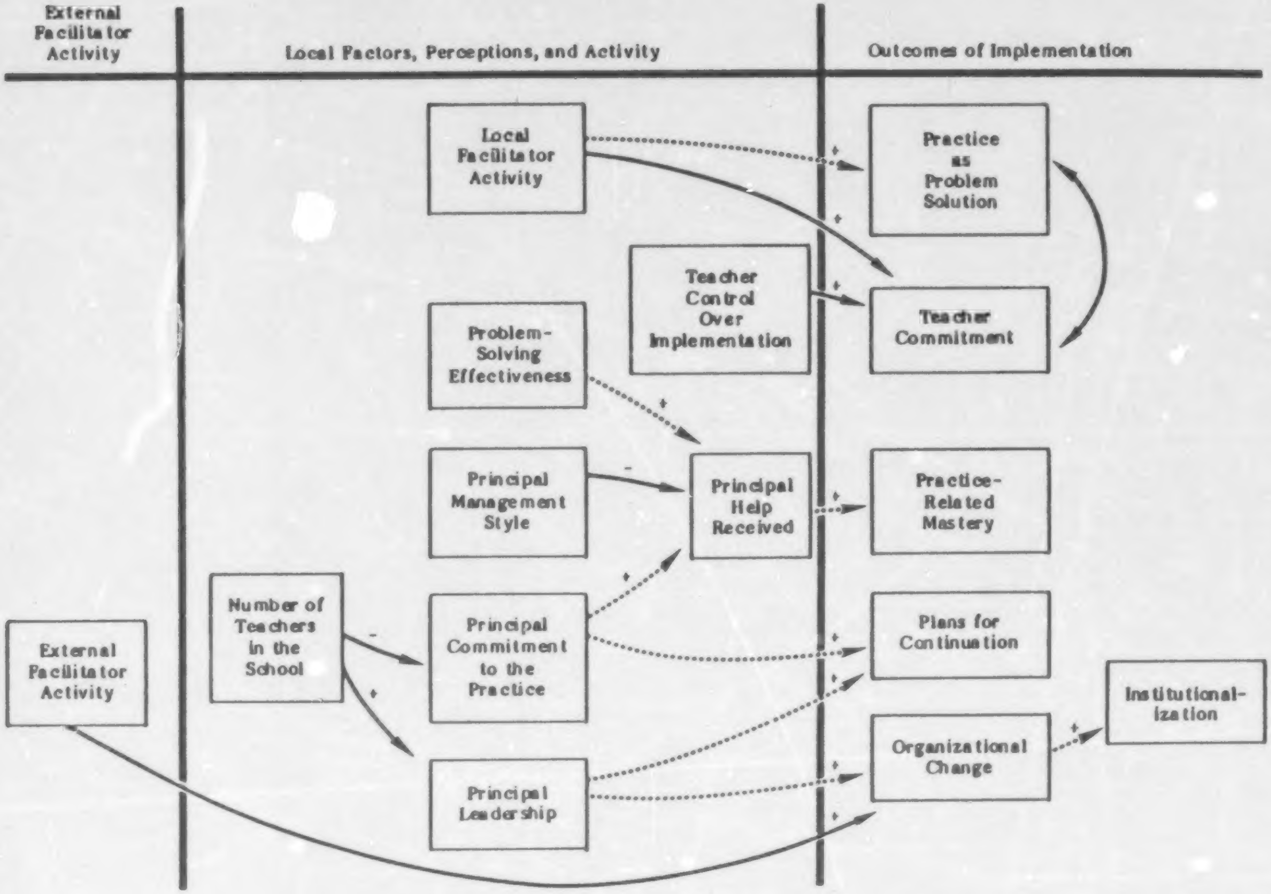


would be predicted by *history and demographics* and *administrative context* in combination with *practice-specific assistance*; that individual outcomes would be predicted by the *teaching context* in combination with *practice-specific assistance*; and that individual outcomes did not predict school-level outcomes.[5]

---

[5] Recall that originally, we posited that individual outcomes would predict school-level outcomes. Since our preliminary analysis led us to the conclusion that individual outcomes must not predict school-level outcomes, we did not conduct additional analyses here. Nevertheless, in their field study, Huberman and Miles found evidence that individual outcomes *do* predict school-level outcomes, just as we originally envisioned. A possible explanation for the discrepancy between our findings and those of Huberman and Miles is that the individual outcomes included in the model predicting school-level outcomes (i.e., *teacher rewards*, *advantages versus disadvantages of the practice*, *net evaluation of the practice*, *practice-related mastery*, *student impact*, and *practice as a problem solution*) are not the same as those included in our model predicting individual-level outcomes (i.e., *perceived benefits*, *change in practice*, *practice-specific mastery*, and *fidelity*); Huberman and Miles' positive findings are based on studying the *latter* group of individual outcomes.

Figure 18: Synthesis B: Predictors of School-Level Outcomes


External Facilitator Activity
Local Factors, Perceptions, and Activity
Outcomes of Implementation
Local Facilitator Activity
Practice as Problem Solution
Teacher Control Over Implementation
Teacher Commitment
Problem-Solving Effectiveness
Principal Management Style
Principal Help Received
Practice-Related Mastery
Number of Teachers in the School
Principal Commitment to the Practice
Plans for Continuation
External Facilitator Activity
Institutional-ization
Organizational Change
Principal Leadership
+
-

Not surprisingly, given that our revised model took into account our preliminary analysis, all of the relationships embodied in our revised conceptual scheme are supported by our data. Three predictions were supported only weakly [that demographics (although not history) would predict both teaching context and school level outcomes, and that administrative context would predict our school-level outcomes]. The remaining five hypotheses were all supported strongly (if teacher commitment is treated as an individual outcome as we came to perceive it).

CHAPTER III: THE ROLES OF KEY ACTORS IN IMPLEMENTATION

In this Chapter, we organize the findings we presented in Chapters I and II by role, taking up each of the actors listed below:

- teachers,
- principals,
- local facilitators,
- central office administrators, and
- external facilitators.

Section 1: The Role of the Teacher

Our findings deal with teacher perceptions, teacher actions, and teacher attitudes. With regard to teacher perceptions, the more help that teachers perceive they have received from the principal, the more faithfully they replicate the developer's version of the practice, the greater their skill in using whatever version of the practice they have evolved, and the more benefits they attribute to the practice. Furthermore, the more control teachers perceive they have over how the practice is implemented, the more they find themselves committed to the practice.

With respect to teacher actions, as teachers spend more time actually using the practice in the classroom, they continue to both

- widen the gap between what they are doing currently and what they did prior to implementing the practice, and
- narrow the gap between their version of the practice and that which the developer considers ideal.

In addition, as teachers increase the amount of time they spend either communicating about the practice or working on materials related to it, they increase the skill with which the developer's version is implemented.

Our interpretations regarding the relationship between teacher attitudes and teacher actions were shaped both by the disconfirmation of our initial assumption that teacher attitudes must be in place before matching teacher actions follow, and by the findings of Huberman and Miles who visited twelve of our sites several times over a year. They concluded (and at minimum our data are not inconsistent with their conclusions) that, under certain conditions -- one of which is that the practice being implemented is educationally sound -- mastery-oriented teacher actions precede favorable teacher attitudes, and then a momentum builds up, each feeding the other. We suspect (backed up by some model testing but mostly mastery field study data) that the dynamics work as follows:

> The teacher agrees to try the practice, sometimes reluctantly. Afterall, what he or she has been doing has felt comfortable and appears far more compatible with his or her style. (Remember that we are talking here about practices that represent major changes.) The teacher's initial attempts feel somewhat awkward, mechanical, and don't yield much in the way of visible results.
>
> Either because the teacher feels obliged to give the practice a fair trial or because of pressure from administrators, facilitators, or colleagues, the teacher persists through the rough spots, working on putting more pieces of the practice into place, and on upgrading his or her skill with respect to the parts that no longer feel quite so awkward. Having put so much time and energy into this enterprise, the teacher now starts looking for some indication that the effort has been justified.
>
> The first indicator that the teacher can detect is that the classroom routine is different; his or her practice is now much more like the developer's practice. Probably the second indicator the teacher notices is increasing competence in implementing the practice. These two indicators spur the teacher on; pride and professional growth are powerful catalysts.
>
> As commitment grows, the teacher intensifies efforts to implement the practice faithfully and skillfully. If the practice is indeed educationally sound and its implementation is reasonably faithful and skillful, it should begin to yield some benefits. The teacher, in a search for justification, is likely to spot them. And if the practice was chosen in order to help solve instructional problems that the teacher was actually facing, then the teacher is likely to notice any indications that it is playing that role. While initial evidence might be rather intangible, it still is enough to strengthen commitment. Furthermore, as time goes by, the evidence is likely to become more and more tangible, thus solidifying the action-results-attitude-action circular process.

Section 2: The Role of the Principal

Principal activity is directly related to five outcomes of implementation -- fidelity, practice-related mastery, perceived benefits, plans for continuation, and organizational change -- and indirectly related (through organizational change) to institutionalization. At first glance, it is confusing. For example, the things that teachers perceive that principals do to help with implementation significantly affect the number of benefits teachers attribute to the use of the practice; however, the help that principals perceive that they give -- principal help given -- is significantly related neither to the help teachers perceive that they receive, nor to implementation outcomes. Why is this?

Teachers need and usually want the principal to provide general direction and practice-specific support, but, given the constraints described above, they also seek and profit from control over their individual implementation activities. So what kind of help are teachers reporting? Our data suggest that teachers report that they have received help from principals when principals ensure:

- that all instructional staff are aware that the successful implementation of the practice is a top priority,
- that the requisite materials are available,
- that teachers have ready access to personnel either within or outside of the district who have practice-relevant knowledge and experience,
- that the teachers are provided with time to actually use the practice through help with classroom scheduling, and through facilitating school-wide scheduling,
- that a school-wide climate exists that is conducive to ongoing, systematic problem-solving, and
- that, when all of the above is in place, teachers are allowed to figure out on their own how to meet the expectations.

Furthermore, we found that the more teachers report that principals have exercised leadership, the more principals report that implementing the practice had led to changes that go beyond what individual teachers do. Such an organizational outcome results when principals ensure

- that teachers understand their expectation that all of the practice's components are to be implemented, and
- that teachers, parents, and central administrators are operating under a realistic time perspective and do not feel pressured by premature evaluations (e.g., that successful implementation of innovations that require major changes will take two to three years, and possibly longer).

One more note of interest about the principal. We found that principals giving practice-specific assistance to teachers contributed to classroom outcomes. Those actions listed above helped teachers change their instructional practice and master the new innovations. On the other hand, when principal behaviors focused on general school-wide direction and leadership, school-level outcomes were the result. Principals whose schools were orderly, where procedures existed for problem-solving, decision-making, and following-through on plans, were more likely to see organizational changes as a result of implementing new practices. So different principal behaviors contribute in different ways to the success of improvement efforts.

Section 3: The Role of the Local Facilitator

Local facilitator activity -- as reported by the local facilitators themselves, who were largely central office personnel -- directly predicts five implementation outcomes, namely: teacher commitment, change in practice, practice-specific mastery, perceived benefits, and the practice as a problem solution. Thus the general implication is that the more help provided by personnel in these roles, the greater the school improvement, especially at the classroom level.

One of our secondary analyses provides more specific guidance: the more time that local facilitators spend training or arranging for training, and the more time they put into working with administrators (presumably to get their commitment to the practice and help develop building-level support systems for its use), the more sophisticated, skillful, and "tuned in" to students the users will be with the practice.

Section 4: The Role of the Central Office Administrator

In contrast to local facilitator assistance, the variable central office help (which was the teachers' report of help received from district-level staff) tells us little about the contribution of personnel outside the individual school building. None of the tests of the model yielded any significant relationships. Fortunately, the field study conducted by Huberman and Miles bears directly on central office administrator activity. We discuss the implications of our combined data in Chapter VIII.

Section 5: The Role of the External Facilitator

External facilitator assistance predicts three implementation outcomes directly (change in practice, organizational change, and perceived benefits) and three implementation outcomes indirectly: practice-specific mastery (through time spent on materials), fidelity (through time spent on classroom use), and institutionalization (through organizational change). At first, it appeared as if much of the impact of external facilitator assistance was negative, but subsequent analysis has prompted us to develop a different conclusion.

More specifically, *external facilitator assistance* appeared to have direct negative impact upon two outcomes of implementation: *change in practice* and *perceived benefits* (it was a direct or indirect positive predictor of the other four implementation outcomes listed in the paragraph above). Of the two negatively influenced outcomes the more puzzling of the two was the negative impact upon *change in practice*. Why, we asked, should substantial external facilitator assistance attenuate the amount teachers change their practice?

In retrospect, this was the wrong question to ask. For one thing, we knew that *external assistance on implementation specifics* was a positive predictor of *change in practice*. But this did not explain why *external facilitator contact with administrators* and *external facilitator teacher training* were negative predictors. A more instructive question turned out to be, Why did teachers who received *small* amounts of these two kinds of assistance change their instructional practice *more*?

The answer lies in the *nature* of the model testing process. Rather than examining *single* relationships in isolation, we should be focusing upon the way in which any given predictor-of-interest acts in conjunction with the other variables that achieve significance. Recall that *local facilitator assistance* was a significant positive predictor of both of the implementation outcomes that are now under discussion. It began to dawn on us that when teachers received small amounts of *external facilitator assistance* but still made large changes in their practice, they were doing so in part because the assistance they needed was being provided by local facilitators. In other words, the larger the change teachers are confronted with making, the more assistance they need, and the less feasible it is for them to receive such assistance from someone outside the district. Thus *assistance received* is a positive predictor, but the more of it that is needed, the greater the proportion provided by the local facilitator.

Worth special mention is the role of the external facilitator in precipitating *organizational change*, perhaps the most important single outcome that is predicted by the factors we studied. Recall that *organizational change* is defined as those principal-reported benefits that have impact on aspects of school life other than individual students or teachers. The benefits mentioned in our survey that qualify under this definition include new instructional methods, better staff socio-emotional state, more external communication, and increased staff skills. Clearly, external facilitators play a constructive role in bringing about such changes.

PART TWO: PREDICTORS OF EXTERNAL FACILITATOR ASSISTANCE

In Part One, we focused upon our two local school models. In Part Two, we shift our attention away from the local schools in order to examine the domain of the external facilitators who assisted them in school improvement efforts. We should indicate at the outset, however, that the following discussion is based upon exploratory analyses. Resources did not permit our following up late-emerging leads, particularly analyzing the relationship between external facilitators and local facilitators when both assisted in the same site.

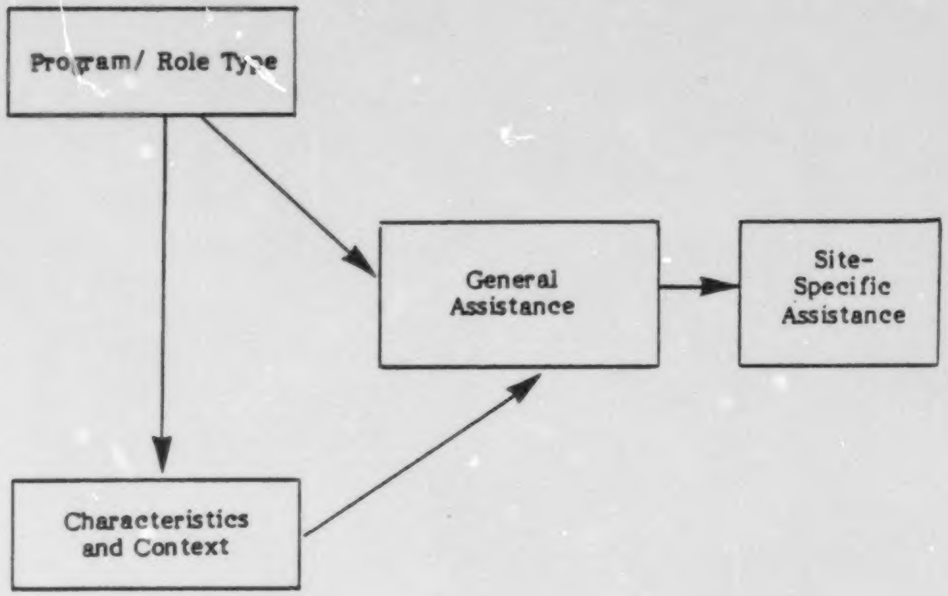
For example, we wanted to follow up the line of reasoning set forth at the end of Chapter III. First we determined that, indeed, on the average, external facilitators gave *less* assistance in most of the assistance activity clusters we identified (see Chapter IV, Section 1) to schools where there were local facilitators present than they gave to schools where no local facilitators were present. Furthermore, we found that *change in practice* scores were higher for schools where both local and external facilitators helped than for schools where no local facilitators were present. In our NDN sample, the mean *change in practice* scores were twice as high for schools without any local facilitators. Clearly, there is much more analysis to be done.

In any event, a glance back at Figure 1 will remind you of the relationship between the local site and external facilitator models. The element common to both sets of models is external facilitator assistance: in the local site models, it is *one* of several predictors; in the external facilitator model, it becomes *the* outcome.

As we indicated in Volume II, we conceptualized external facilitator assistance as consisting of general assistance and site-specific assistance. The former is an accounting of the external facilitator's *typical* activities with client schools; the latter concerns help given to a *particular* school in the sample. (It is this second measure that unites the local site and external facilitator models).

To remind you of the general structure of our external facilitator assistance model, we have reproduced Figure 4 on the following page. In Chapters IV and V, we shall discuss the results of testing our hypotheses regarding the predictors of *general assistance* and *site-specific assistance*, respectively. Then in Chapter VI, we shall integrate these two sets of findings.

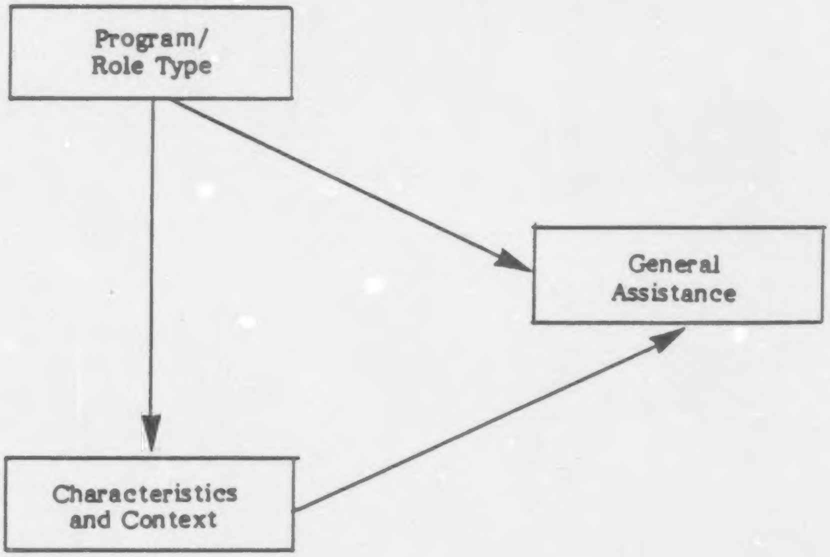
Figure 4: General Structure of the Model Predicting External Facilitator Assistance


Program/ Role Type
General Assistance
Site-Specific Assistance
Characteristics and Context

CHAPTER IV: PREDICTORS OF THE GENERAL ASSISTANCE PROVIDED BY EXTERNAL FACILITATORS

The general assistance model that we tested was constructed to synthesize our notions about the variables that would allow us to predict the types of assistance a given external facilitator would provide in general. As can be seen in Figure 19, we hypothesized that program/role type would predict general assistance both directly and indirectly (through characteristics and context.

Figure 19: The Component of the External Facilitator Assistance Model Predicting General Assistance



In Section 1, we shall identify the seven clusters of assistance that served as our outcome measures in this model, define program/role type, and specify the characteristics and context variables that we hypothesized would be predictors.

Section 1: The Variables

As we explained in Volume II, external facilitator respondents were shown a list of possible assistance activities that was derived from the compendium of linker behaviors compiled by the Belmont Task Force on Linking Functions (Havelock, 1979). The list was used in two forms: one version was included in the External Agent General Questionnaire to elicit information about respondents' typical or general assistance behavior; the second was a component of the External Agent Site-Specific Interview, where respondents were asked to describe their assistance to particular schools in the study sample. In each case, respondents were to read through the list of 30 items, marking the frequency with which they performed each activity.

The general assistance data obtained from the first set of instruments was factor analyzed. A varimax rotation of the factor matrix obtained produced seven factors which seemed to fit the data reasonably well, both conceptually and analytically:

- Initiation/awareness consists of activities that initiate contact with local schools seeking to adopt/develop new practices, e.g., arranging or participating in awareness conferences.
- Support of teachers is a set of behaviors, such as seeking commitment and building support among school personnel, that suggest teacher contact and a generally supportive style.
- Administrator adoption preparation focuses upon non-teaching staff to gain their commitment, support, etc.
- Teacher adoption preparation covers arranging and performing training.
- Implementation specifics consists of planning implementation schedules, providing technical assistance or follow-up training, and assisting teachers in working out procedural details.
- Evaluation is comprised of collecting and analyzing impact data, and helping the local site to conduct an evaluation of the new practice.
- Continuation/diffusion refers to activities aimed at institutionalizing the new practice: developing a plan to support continuation and developing additional new users at the site.

We then identified a number of potential characeristics and context predictors of general assistance and performed a series of regression analyses on the pooled within-program covariance matrices (mechanically, these were done as MANCOVAS). From this pool of potential predictors, we selected a subset that had performed well in preliminary analyses to try as predictors:

- Program/role type: this divides the external facilitator sample into four groups based upon program affiliation:
    - NDN Developer/Demonstrators,
    - NDN State Facilitators,

  - State-administered program facilitators (usually practice developers), and
  - Title IV-C locally developed external facilitators.

- *Work setting*: this cluster of variables concerns the work environment of the external facilitator and includes the type of host organization, work setting advantages, work setting disadvantages, size of service area, number of dissemination personnel, etc.

- *Role parameters*: this cluster focuses on the definition of the external facilitator's work role. Included here are project director/other, career goals, number of years in current position, number of other job titles, autonomy, job satisfaction, etc.

- *Personal characteristics*: this cluster refers to the individual traits of external facilitators. Falling into this category are education, number of professional organizations, intolerance of ambiguity, etc.

- *Strategic orientation*: this cluster consists of variables having to do with the external facilitator's orientation toward his/her assistance role. Included here are product vs. capacity, adaptation as a philosophy, local vs. cosmopolitan, etc.

- *SEA support*: this is an index based upon the external facilitator's assessment of the amount of assistance received by the SEA (state education agency) in the state where his/her host organization was located.

- *Outside assistance received by external facilitator*: this is an index of the number of sources of help external facilitators reported getting from outside their host organizations.

- *General role maintenance*: this cluster covers activities performed by external facilitators in support of their general work with schools. Included here are such variables as percents of time spent on administration, percent of time spent on travel, percent of time on product development, etc.

Many variables originally included in the clusters were eliminated from further analysis because of lack of data or skewed distributions. Others were deemed to be of value for descriptive purposes, but likely to have little impact on the behavior of external facilitators. (A discussion of these variables appears in Volume II.) Still others were tested in simple correlations or analyses of variance before being eliminated from the model for such reasons as correlating so strongly with program/role type that we saw no reason to add it to the model. (These, too, are described in Volume II.)

This left us with program/role type and 19 other variables to be tested as predictors, but our test of the model did not prove significant. We then eliminated nine more variables and ended up with those listed below:

- Education: the highest level of education achieved.
- Job satisfaction: an index of the number of ways in which the external facilitator indicated satisfaction with his/her work.
- Number of professional organizations: the number of memberships in professional associations held by the external facilitator.
- Local/cosmopolitan orientation: a sorting of external facilitators into local, mixed, or cosmopolitan, on the basis of the type of professionals they cited as their colleagues (e.g., local teachers vs. researchers).
- Project director: whether the external facilitator was a project director or other (staff, "lone operator," etc.).
- Number of other job titles: an indication of role mutiplicity, or the quantity of other "hats" worn by the external facilitator.
- Intolerance of ambiguity: the extent to which the respondent was uncomfortable in ill-defined situations.
- Amount of travel: the percentage of role maintenance time spent in travel to client schools, conferences, etc.
- Product vs. capacity orientation: the extent to which the external facilitator was oriented toward working with one product or practice vs. helping schools develop capacity for improvement.
- Adaptation as philosophy: whether or not the external facilitator reported having a philosophy that all implementation of a new practice involves adaptation.

Section 2: The Findings

The sample for this analysis was 45 external facilitators, broken down by program/role type as follows:

- 25 NDN Developer/Demonstrators,
- 11 NDN State Facilitators,
- 7 State-administered program developers, and
- 2 Title IV-C locally developed project external facilitators.

The regression coefficients and standard errors are presented in Appendix M.

In the remainder of this chapter, we look at each general assistance factor and comment on the six variables that turned out to be significant predictors (or to have achieved borderline significance as predictors). The regression coefficients and standard errors are presented in Appendix M.

Predictors of Initiation and Awareness Activities

This set of activities includes arranging or participating in awareness conferences, distributing general information (e.g., flyers, newsletters), hosting visits to review materials, holding demonstration visits, and contacting new clients by mail, telephone, or in person. One predictor was highly significant ($p < .008$): whether or not the external facilitator was a project director.

In our sample, project directors were typically the original developers of either a product (either an innovative practice or innovative materials) or a project (such as a State Facilitator project). Most of the project directors in the former group have been presenting their practices to the outside world from their initial involvement as external facilitators. Therefore, it is not surprising that they continue to favor this activity.

Predictors of Administrator Adoption Preparation

Moving to the next set of activities, we find that project director also is a significant positive predictor of administrator adoption preparation, which includes seeking commitment from school administrators, seeking support from local school boards, preparing a "case" for the decision to adopt, working with administrators, and allocating financial resources.

In addition, local/cosmopolitan has borderline significance as a negative predictor of administrator adoption preparation. Local/cosmopolitan sorts respondents according to the types of educators they considered to be their colleagues (either local educators, e.g., teachers, principals, and district specialists; or a more national or cosmopolitan group, e.g., federal program colleagues and researchers; or mixed, citing educators from both local and national groups as colleagues). As we expected, locally-oriented external facilitators do more work with administrators than do their more nationally-oriented colleagues.

Predictors of Teacher Adoption Preparation

Teacher adoption preparation, which consists of arranging training, training the users, providing detailed information, and securing materials or other required resources, is the most frequently performed cluster of assistance activities. Both project director and level of education have borderline significance as predictors of this assistance activity.

Predictors of Implementation Specifics

Number of job titles was a borderline negative predictor of implementation specifics, suggesting that those external facilitators who wear many hats provide little assistance on implementation specifics, and, conversely, those who spend more have such work as their primary role.

Predictors of Support of Teachers

Local/cosmopolitan achieved borderline significance as a negative predictor of support of teachers, which includes seeking commitment, building support among school personnel. This suggests that compared to external facilitators who we have rated as cosmopolitan, those who consider local educators to be their colleagues perform more support of teachers activities.

Predictors of Evaluation

None of the relationships between the predictors and evaluation turned out to have even borderline significance.

Predictors of Continuation/Diffusion

Continuation/diffusion activities -- which include developing a plan to support continuation and developing additional new users at the local site -- are performed less frequently than any other kind we studied. Both intolerance of ambiguity and job satisfaction have borderline significance as positive predictors of this form of help.

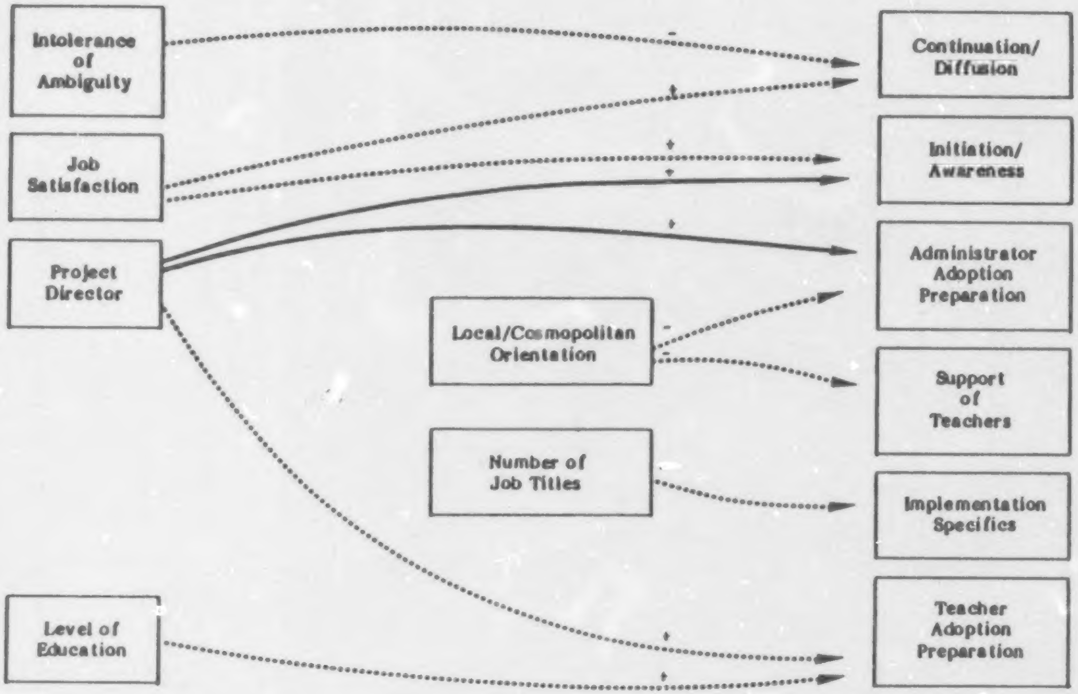
Program/Role Type as a Predictor

Our analysis of covariance indicated that program/role type was not a direct predictor of any of the kinds of general assistance that we studied. In other words, the characteristics and contexts of external facilitators are more powerful predictors of the assistance activities they carry out in general than their program/role type.

Synthesis of Findings

Figure 20 summarizes the findings presented in this chapter.

Figure 20: Predictors of *General Assistance*


Intolerance of Ambiguity
Job Satisfaction
Project Director
Local/Cosmopolitan Orientation
Number of Job Titles
Level of Education
Continuation/ Diffusion
Initiation/ Awareness
Administrator Adoption Preparation
Support of Teachers
Implementation Specifics
Teacher Adoption Preparation
-
+
+
+
+
-
-
+
+

CHAPTER V: PREDICTORS OF THE SITE-SPECIFIC ASSISTANCE PROVIDED BY EXTERNAL FACILITATORS

The purpose of constructing a site-specific assistnce model was to address the question:

> When program/role type is taken into account, how well do the kinds of assistance that external facilitators reported that they provided in general to client schools predict the kinds of assistance that they gave to the specific sites in our study sample?

As Figure 21 shows, we initially hypothesized that the general assistance factors would be the sole predictors of site-specific assistance activities. However, when program/role type did not turn out to be a predictor for any kind of general assistance activity, we decided to try it as a predictor of site-specific assistance as shown in Figure 22.

Figure 21: Initial Version of the Component of the External Facilitator Assistance Model that Predicts Site-Specific Assistance

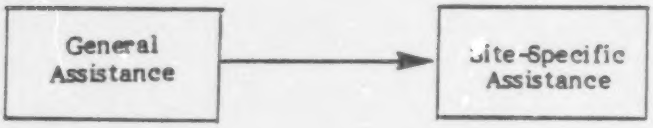
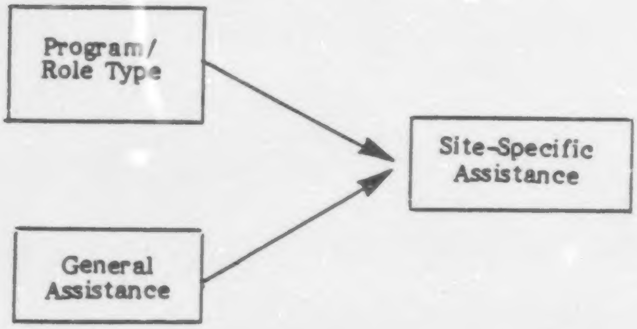


Figure 22: Revised Version of the Component of the Model that Predicts Site-Specific Assistance



Section 1: The Variables

The catgories of external facilitator assistance that were used as predictors in this analysis are the same categories that were used as outcomes in Chapter IV. Furthermore, the nine site-specific assistance categories are based on these seven; in fact, five are identical:

- initiation/awareness,
- support of teachers,
- implementation specifics,
- evaluation, and
- continuation/diffusion.

The remaining two general assistance categories were divided into two variables each. Specifically,

- administrator adoption preparation was divided into seeking administrator commitment and allocating financial support, and
- teacher adoption preparation was divided into providing teacher training and providing materials.

Altogether then, we tested the extent to which program/role type and seven general assistance factors predicted nine site-specific kinds of assistance.

Section 2: The Findings

Sixty-five external facilitators were included in this analysis, broken down by program/role type as follows:

- 33 NDN Developer/Demonstrators,
- 7 NDN State Facilitators,
- 15 state-administered program developers, and
- 10 Title IV-C locally developed project external facilitators.

As we had hoped, the regression analysis resulted in a highly significant model ($p < .0001$). For six of the nine site-specific assistance categories, the general assistance predictors accounted for a substantial amount of variance. These six are listed in Table 6, and the regression coefficients and standards errors for each predictor appear in Appendix N.

Table 6. Levels of Significance and Amounts of Variance Explained in Regression Analyses on Site Site-Specific Assistance Factors

Dependent Variables	R^2	ρ
Initiation/Awareness	.02	.26
Support of Teachers	.04	.23
Providing Teacher Training	.01	.28
Providing Materials	.04	.24
Implementation Specifics	.01	.30
Evaluation	.01	.27

General Assistance Predictors of Site-Specific Assistance

Below, we take up each of these categories of site-specific assistance one at a time, identifying the general assistance factors that predict them.

Predictors of Initiation/Awareness

The general assistance factor initiation/awareness is a significant positive predictor of its site-specific counterpart, while evaluation is a significant negative predictor of initiation awareness.

Predictors of Support of Teachers

Both of the general assistance factors support of teachers and evaluation are significant positive predictors of the site-specific assistance category support of teachers, while administrator adoption preparation turned out to have borderline significance as a negative predictor of this form of site-specific assistance.

Predictors of Providing Teacher Training

The general assistance factor administrator adoption preparation achieved significance as a negative predictor of the site-specific assistance category providing teacher training.

Predictors of Providing Materials

Two general assistance factors were positive predictors of the site-specific category providing materials, one of them achieving significance -- teacher adoption -- and the other achieving borderline significance -- implementation specifics. In addition, administrator adoption preparation turned out to be a significant negative predictor of this form of site-specific assistance.

Predictors of Implementation Specifics

The general assistance factor *support of teachers* achieved significance as a positive predictor of *implementation specifics*, while *administrator adoption preparation* turned out to have borderline significance as a negative predictor of *implementation specifics*.

Predictors of Evaluation

The general assistance factor *evaluation* was a significant positive predictor of its site-specific counterpart, while *continuation/diffusion* turned out to be a significant negative predictor of site-specific *evaluation*.

Predictors of Seeking Financial Support

Although the overall analysis of covariance using *seeking financial support* as a dependent variable did not prove to be significant, on a one-on-one basis, *administrator adoption preparation* turns out to be a significant positive predictor of *seeking financial support*.

Synthesis: General Assistance Factors That Predict Site-Specific Assistance

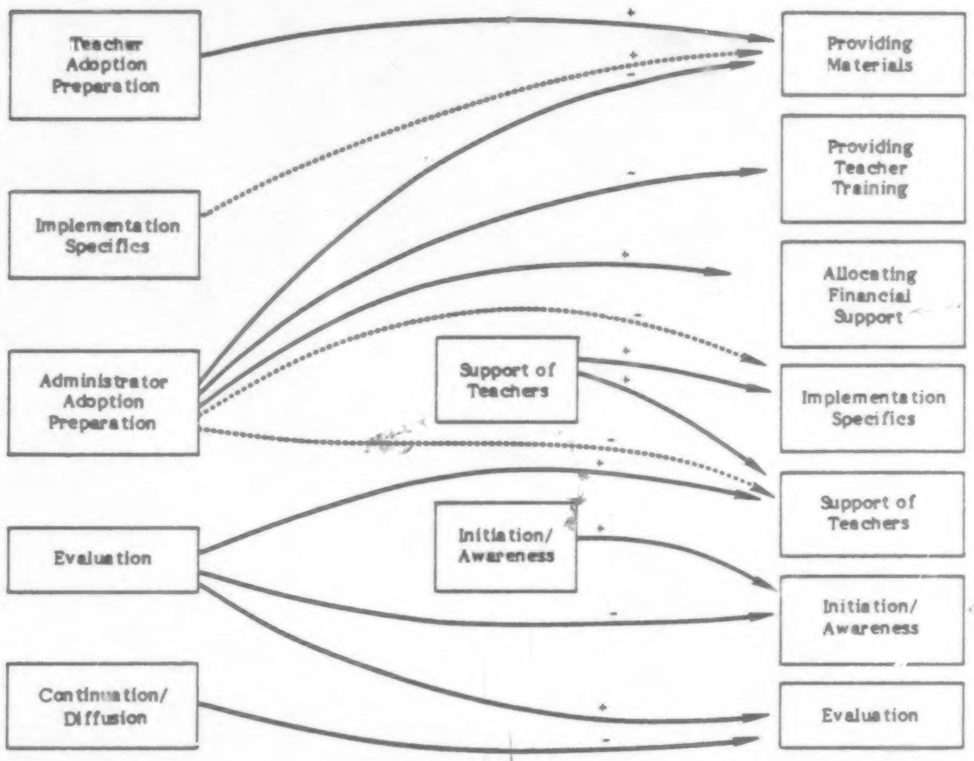
Figure 23 displays all of the findings presented to date in this chapter. Note that there are three sets of negative relationships. The major set of such relationships involves the general assistance factor *administrator adoption preparation*, which turned out to be a predictor of five site-specific assistance categories. For four of these categories, *administrator adoption preparation* is a negative predictor, *all* of which have to do with working with teachers:

- *support of teachers*,
- *providing teacher training*,
- *providing materials*, and
- *implementing specifics*.

In other words, the stronger the general predisposition of external facilitators to work with administrators, the less time they report spending actually working with teachers in particular sites.

The second negative relationship of interest is that between the general assistance predictor *continuation/diffusion* and the site-specific assistance category *evaluation*. This finding means that the stronger the general predisposition of external facilitators to work toward either developing plans to support the continuation of practices or increasing the number of users at

Figure 23: Predictors of Site-Specific Assistance


Teacher Adoption Preparation
Implementation Specifics
Administrator Adoption Preparation
Evaluation
Continuation/ Diffusion
Support of Teachers
Initiation/ Awareness
Providing Materials
Providing Teacher Training
Allocating Financial Support
Implementation Specifics
Support of Teachers
Initiation/ Awareness
Evaluation

local sites, the less time they report spending actually helping particular sites evaluate the effectiveness of newly implemented practices.

The remaining negative relationship is that between the general assistance predictor *evaluation* and the site-specific assistance category *initiation/awareness*. This finding means that the stronger the general predisposition of external facilitators to help local sites evaluate new practices, the less time they report spending actually arranging or conducting awareness activities at particular sites.

It does not seem to be going very far from our data to assert that external facilitators tend to make three fundamental choices:

- whether to specialize in working with administrators or teachers,
- whether to emphasize *front-end* assistance (i.e., awareness activities) or *back-end* assistance (i.e., continuation, diffusion, and evaluation activities), and, for those who choose to emphasize the latter,
- whether to concentrate on supporting the continuation of the practice at local sites and increasing the number of its users or on helping local sites evaluate what they have already implemented.

Program/Role Type as a Predictor of Site-Specific Assistance

Our initial analysis indicated that *program/role type* is a predictor of site-specific assistance. Unfortunately, we discovered an error in the coding of our *program/role type* variable. However, it appears that the error caused us to *underestimate* the strength of the relationships between *program/role type* and both *general* and *site specific assistance*. If the corrected runs maintain the findings that we have reported above -- i.e., that *program/role type* predicts *site-specific* but not *general assistance* -- this would mean

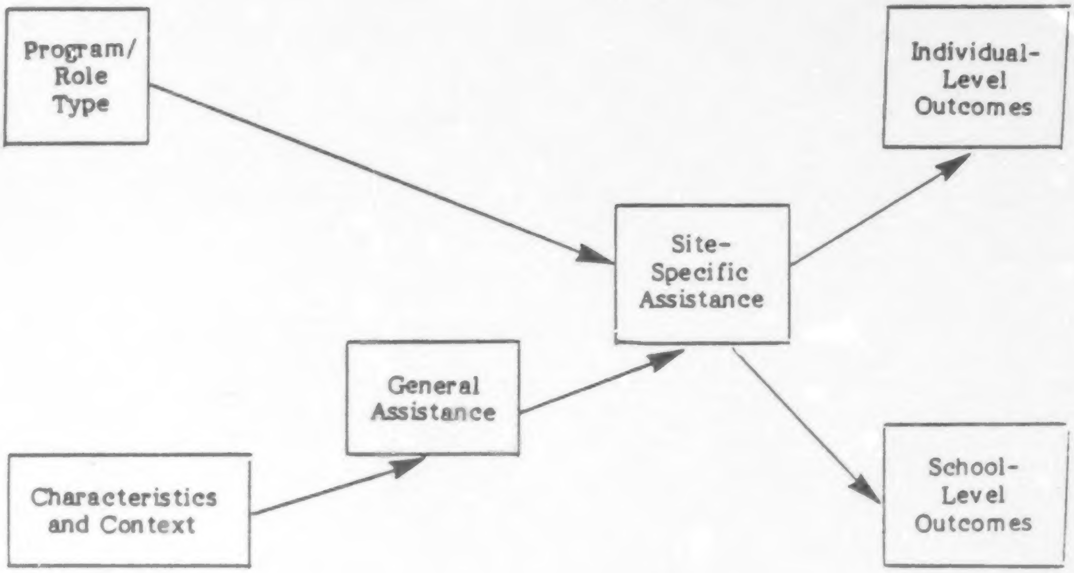
- that individual characteristics outweigh program characteristics when external facilitators are asked to describe what they typically do, but
- that program constraints are more salient whenever external facilitators describe what they have done in a particular site.

Perhaps program constraints come into play when delivering assistance to a particular site because the local school clients have expectations for their external facilitators that are based upon knowing their program affiliation.

CHAPTER VI: CONCLUSIONS REGARDING THE PREDICTORS OF EXTERNAL FACILITATOR ASSISTANCE

Our findings to date have led us to elaborate our external facilitator assistance model one more time; our revision is displayed below in Figure 24.

Figure 24. Revised Model of External Facilitator Activity



Moving from the lower left corner, the general orientation of external facilitators is somewhat shaped by their characteristics and contexts, but not by the program with which they are affiliated, nor by their particular role in that program. On empirical grounds, the predictor in which we have most confidence is project director; if external facilitators are project directors, they are more likely to be predisposed toward arranging and conducting awareness activities as well as toward working closely with administrators.

Continuing our movement to the right, the general predisposition of external facilitators appears to combine with their program/role type to influence the nature of the assistance they provide in particular sites. Perhaps the most important general assistance predictor of the kind of site-specific assistance external facilitators give is the extent of their predisposition to work closely with administrators. This allows us to build the following chain: if external facilitators are project directors, they are more likely to be predisposed to work closely with administrators; those who have such a predisposition are less likely (than those external facilitators who are project staff) to work closely with teachers.

With regard to school improvement outcomes, we need to look separately at the level of the individual and at the level of the school. With respect to the former, our data suggest that external facilitators contribute indirectly to such individual-level outcomes as *fidelity* and *practice-specific mastery*. Beyond this, our data suggest that what external facilitators do probably depends upon whether their local school clients have local facilitators to assist with the implementation of the practice. When local facilitators are present, we believe that external facilitators perceive less need to be involved with teachers. Nevertheless, when they provide teachers with technical assistance and follow-up training, or help them plan implementation schedules and work out procedural details, they prove helpful.

With regard to school-level outcomes, we consider our most important finding to be the confirmation of our hypothesis that the amount of external facilitator assistance activity predicts the number of principal-identified organizational changes.

At the outset of Chapter IV, we indicated that our analysis of our external facilitator data could best be described as exploratorv. Thus it is appropriate in our conclusion to identify an area for further study. As we indicated in Chapter V, it appears that external facilitators may confront choices such as whether to concentrate on working closely *with administrators* or *with teachers*. Perhaps there are a small number of *patterns* of external assistance, for example:

- a locally oriented project staff external facilitator who works directly with teachers,
- an external facilitator who works through local facilitators (i.e., the local facilitators engage in most of the on-site interaction with teachers), and
- a project director external facilitator who works with administrators and has little involvement with teachers.

We have found individuals in our sample who give credence to this notion. Now that we understand more about patterns of implementation, examining patterns of assistance strikes us as a reasonable next step.

PART THREE: CONCLUSIONS

CHAPTER VII: SUMMARY OF FINDINGS

This chapter is divided into two sections: the first deals briefly with our "failed variables"; the second with findings.

Section 1: Failed Variables

By "failed variables," we mean variables that were tested as predictors of one or more other variables but that failed to achieve even borderline significance every single time. All of the failed variables in our local school models are displayed in Table 7 along with the variables that we initially believed they might relate to.

With penetrating hindsight, we have been able to dismiss some of these failed predictions with sentences that begin, "Of course." However, other failures have led us to insights we consider worth sharing. We comment on three failed variables:

- Principal help given. We hypothesized that there would be a relationship between the amount of help principals reported that they gave and individual-level outcomes. As we indicated in Chapter III, there is apparently quite a difference between the amount of help principals report that they have given and the extent to which teachers report that they have received such help. Furthermore, the major issue is not the amount of help but its nature.

- Central office responsiveness to teachers. We believed that this variable would be related to teacher commitment. What does it mean to say that the central office is highly responsive to teachers? From Huberman and Miles we learn that it sometimes means that central administrators accede to teacher requests to modify the practice, often in ways that remove what makes the practice powerful. As we reflected upon this, we recognized that the act of granting permission to take such liberties sends a message: "The practice need not be perceived as indivisible, as possessing a coherence and an integrity that must be respected." Thus we now see why under some circumstances, being "responsive" can weaken teacher commitment.

- Endorsment and opposition to the practice. As was the case of the previously discussed variable, we believed that the opinion of others about the practice would influence the intensity of each teacher's commitment to that practice. However, we now peceive teacher commitment primarily as an outcome which, when generated, serves to boost some of the outcomes that spawned it. Thus instead of shaping teacher commitment, endorsement and opposition to the practice probably reflects it (or its lack), and it probably lags

Table 7: Relationships that Failed to Achieve Significance

Failed Predictor	Variable Predicted
Implementation Requirements of the Practice	Perceived Benefits
	Change in Practice
Additional Staff for the Practice	Practice-Specific Mastery
Principal Help Given	Fidelity
Teacher Autonomy	Plans for Continuation
Student Impact	Faculty Attitude Toward School Improvement
School Improvement History	Principal Commitment
Central Office Management Style	
Central Office Power	Administrative Power Over Implementation
Administrative Power Over Implementation	Principal Leadership Teacher Commitment
Central Office Responsiveness to Teachers	Teacher Commitment
Money	
Material Support	
Endorsement/Opposition	
Teacher Characteristics	

behind due to the operation of pluralistic ignorance. If this is the case, it is clear why we did not find the simple relationship we believed might exist.

Section 2: The Findings

In this section we report findings that we trust. This includes only findings

- that achieved at least borderline significance (i.e., where $p < .10$), and
- that either (a) were obtained on our largest and most diverse sample (The All-Programs Major Required Change sample), (b) supported our initial hypotheses and/or, (c) when at variance with them, prompted us to achieve a new way of fitting together multiple data points.

Our decision not to emphasize isolated or puzzling relationships should not be construed as indicating that we devalue such findings. For while we realize that some such findings occur bv change (and are therefore not replicable), we also recognize that findings that violate well-defended preconceptions bestow opportunities for creating new syntheses. Then why refrain from reporting our not-yet-meaningful results? To provide as succinctly as possible -- with minimal distraction -- the fruits of our integrative efforts.

We begin by reporting what we learned about activity at the local site, then turn to predictors of external facilitator activity.

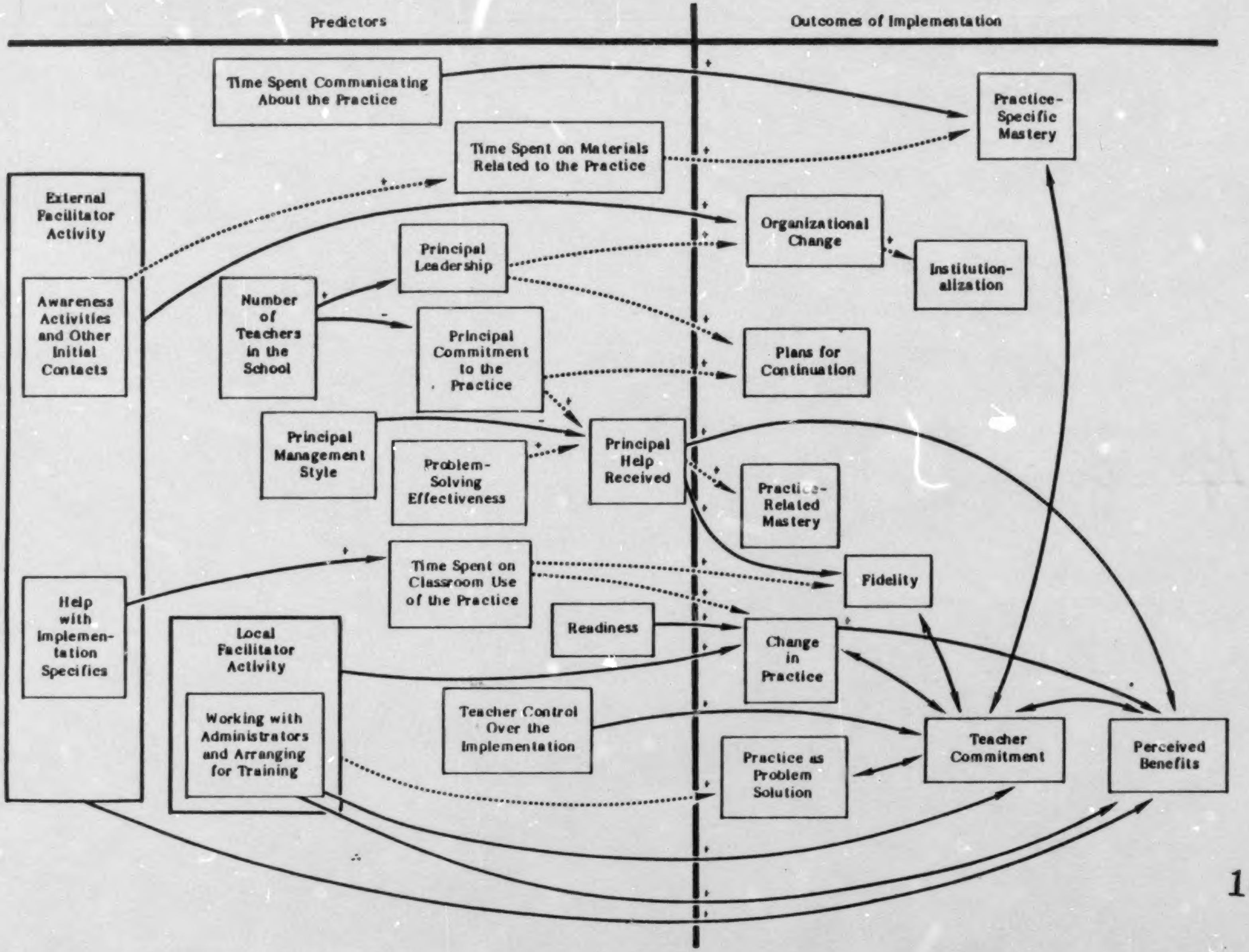
Findings Related to Local School Outcomes

Our first major finding was that the dynamics of implementation depend upon the amount that teachers are expected to change their instructional practice. When teachers are confronted with the expectation that they change their current practice in major ways, we can describe relationships between key predictor variables and selected outcomes of implementation with considerable confidence. However when the "magnitude of required change" is low or moderate, the relationships appear to be far less predictable (However, note in our Chapter I report on findings from the minor required change sample the hint of a successful implementation scenario.) In any case, as a result of this first finding, all of the remaining findings reported in this chapter related to our individual-level outcomes are based upon our major required change sample.

Moving now to our models predicting the outcomes of implementation, Figure 25 integrates our findings from both of our local school models. Note the three kind of arrows:

- a continuous line, meaning that the prediction is significant at the .05 level;

Figure 25: Synthesis C: Predictors of Outcomes of Implementation


Predictors
Outcomes of Implementation
Time Spent Communicating About the Practice
Practice-Specific Mastery
Time Spent on Materials Related to the Practice
External Facilitator Activity
Awareness Activities and Other Initial Contacts
Organizational Change
Institutionalization
Principal Leadership
Number of Teachers in the School
Principal Commitment to the Practice
Plans for Continuation
Principal Management Style
Problem-Solving Effectiveness
Principal Help Received
Practice-Related Mastery
Help with Implementation Specifics
Time Spent on Classroom Use of the Practice
Fidelity
Readiness
Local Facilitator Activity
Working with Administrators and Arranging for Training
Change in Practice
Teacher Control Over the Implementation
Teacher Commitment
Perceived Benefits
Practice as Problem Solution
+
-

- a broken line, meaning that the prediction only achieves borderline significance ($p < .10$); and
- a double-headed arrow meaning that we suspect the relationship is bidirectional or circular. (No level of significance is implied for these arrows.)

For both those who want to study a simpler diagram and those who want to exercise caution, we have included Figure 26 which again integrates our findings from both of our local school models, but does so only for relationships that are significant at the .05 level (or are thought to be circular). However, from our perspective, the meat is in Figure 25. Please note that:

- Spending time on different aspects of the practice yields different outcomes. In particular, spending time working on materials related to the practice and spending time communicating about the practice both appear to lead to practice-specific mastery, whereas spending time on classroom use of the practice appears to lead to both fidelity and to change in practice.
- Teacher commitment plays a central but complex role. Teacher commitment tends to emerge only after key outcomes begin to manifest themselves. Then it interacts with these outcomes both as cause and effect. However, two variables are not results of teacher commitment, but predictors of it: local facilitator help and teacher control over the implementation.
- The key actors in the teacher's environment tend to contribute to the achievement of different outcomes, and to do so in different ways. Table 8 displays the nature of the impact that three key actors have on ten different outcomes of implementation. Apparently, while principals and local facilitators tend to contribute directly, external facilitators tend to contribute indirectly. Furthermore, while all three contribute to perceived benefits, principals alone appear to contribute to both practice-related mastery and plans for continuation, local facilitators alone appear to contribute to both teacher commitment and the practice as a problem solution, and external facilitators alone appear to contribute to practice-specific mastery.
- For any given actor, different aspects of his or her activity contribute to different outcomes. One example of this is that when external facilitators spend a lot of time on awareness activities and other initial contacts, it tends to result in reasonably good practice-specific mastery, whereas when they concentrate on helping with implementation specifics, it tends to result in reasonably good fidelity, and reasonably substantial change in practice.

Figure 26: Synthesis D: Significant Predictors of Outcomes of Implementation

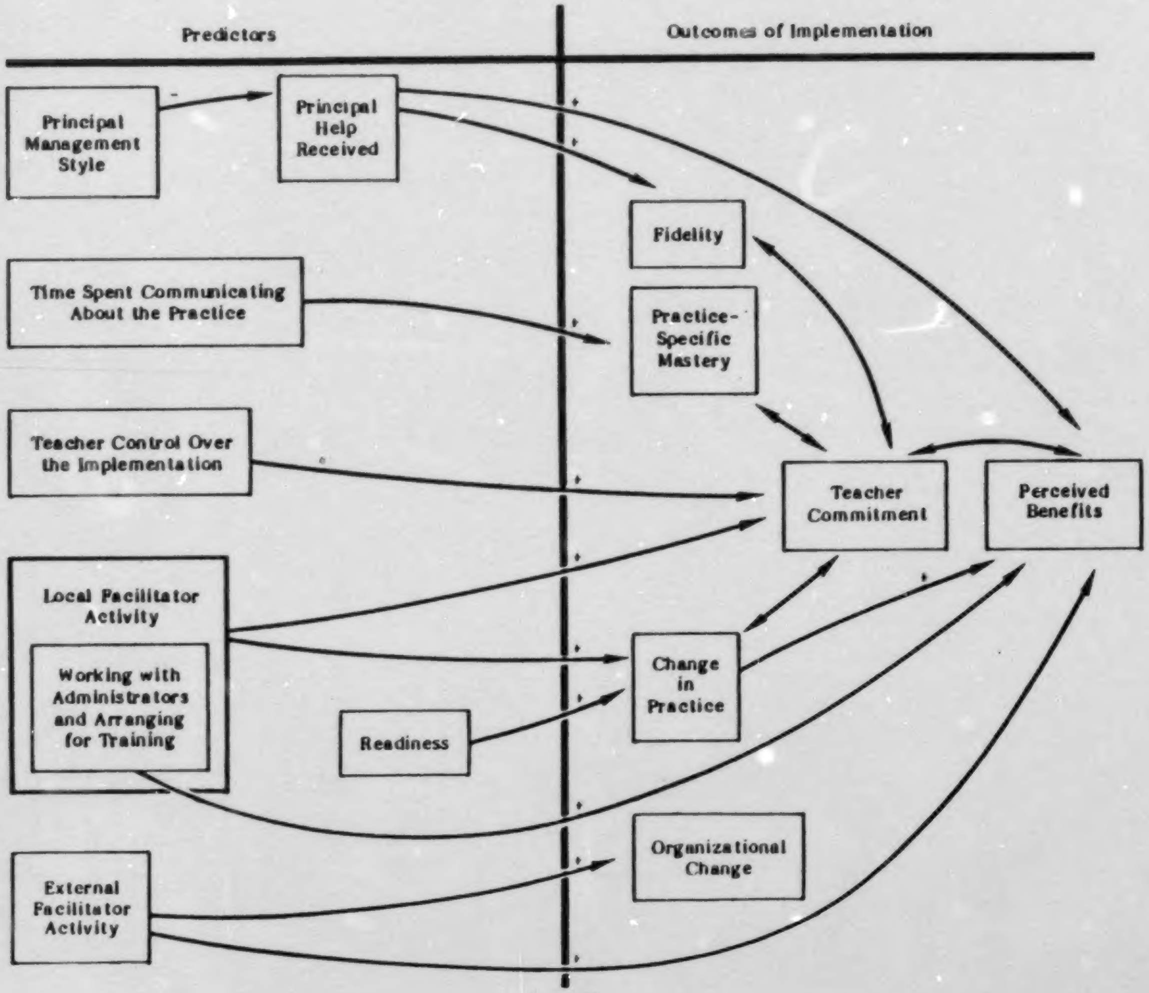

Predictors
Outcomes of Implementation
Principal Management Style
Principal Help Received
Time Spent Communicating About the Practice
Teacher Control Over the Implementation
Local Facilitator Activity
Working with Administrators and Arranging for Training
Readiness
External Facilitator Activity
Fidelity
Practice-Specific Mastery
Teacher Commitment
Perceived Benefits
Change in Practice
Organizational Change

Table 8: Nature of the Contributions of Principals, Local Facilitators, and External Facilitators to Ten Outcomes of Implementation

	Perceived Benefits	Practice as a Problem Solution	Teacher Commitment	Change in Practice	Practice-Specific Mastery	Fidelity	Organizational Change	Institutionalization	Practice-Related Mastery	Plans for Continuation
Principals	Direct					Direct	Direct	Direct	Indirect	Direct
Local Facilitators	Direct	Direct	Direct	Direct						
External Facilitators	Direct			Indirect	Indirect	Indirect	Direct	Indirect		

Saying that an actor contributed directly to an outcome of implementation means that some activity of that actor has achieved at least borderline significance as a direct predictor of that outcome; saying that an actor contributes indirectly means that some activity of that actor has achieved at least borderline significance as a predictor of another variable that is a direct or indirect predictor of that outcome.

Not shown in either Figure 25 or Figure 26 is our finding that external facilitators tend to concentrate their energies on sites in which local facilitators are either absent or only minimally involved.

Findings Related to External Facilitator Activity

Figure 27 integrates the findings from examining the predictors of external facilitator general assistance and those of external facilitator site-specific assistance, while Figure 28 does the same thing solely for relationships that are significant at the .05 level.

From our perspective, the external facilitator component of our study yielded three important findings:

- The most powerful predictor of the kinds of help external facilitators give is whether their position in their host agency is that of a project director or that of a staff member.
- External facilitators appear to specialize in predictable ways: first, they tend to work mostly with administrators or mostly with teachers; second, they tend to emphasize such front-end activities as conducting awareness sessions or such back-end activities as working to ensure the practice's continuation, to promote its diffusion, and to assist with its evaluation.
- Although not apparent in either Figure 27 or 28, the specific federal or state program that provides financial support for their work appears to have rather minimal influence upon what external facilitators report that they do in general when helping clients, but substantial influence upon what they report that they do in particular sites. To make sense out of this finding, it is important to understand that external facilitators sometimes earn their money from more than one source. Thus, it would be difficult for one of their sources of income to have much impact upon what kind of help they provide in general, but quite appropriate for any given source to exert a noticeable influence when paying a particular bill.

Visual Synthesis of Our Statistically Significant Findings

Figure 29 displays all of the statistically significant findings that we consider trustworthy; it is our synthesis of our syntheses. What does this all mean for the practitioner, the administrator, the facilitator, or the policymaker? The answer is the substance of Part Three.

Figure 27: Synthesis E: Predictors of External Facilitator Assistance

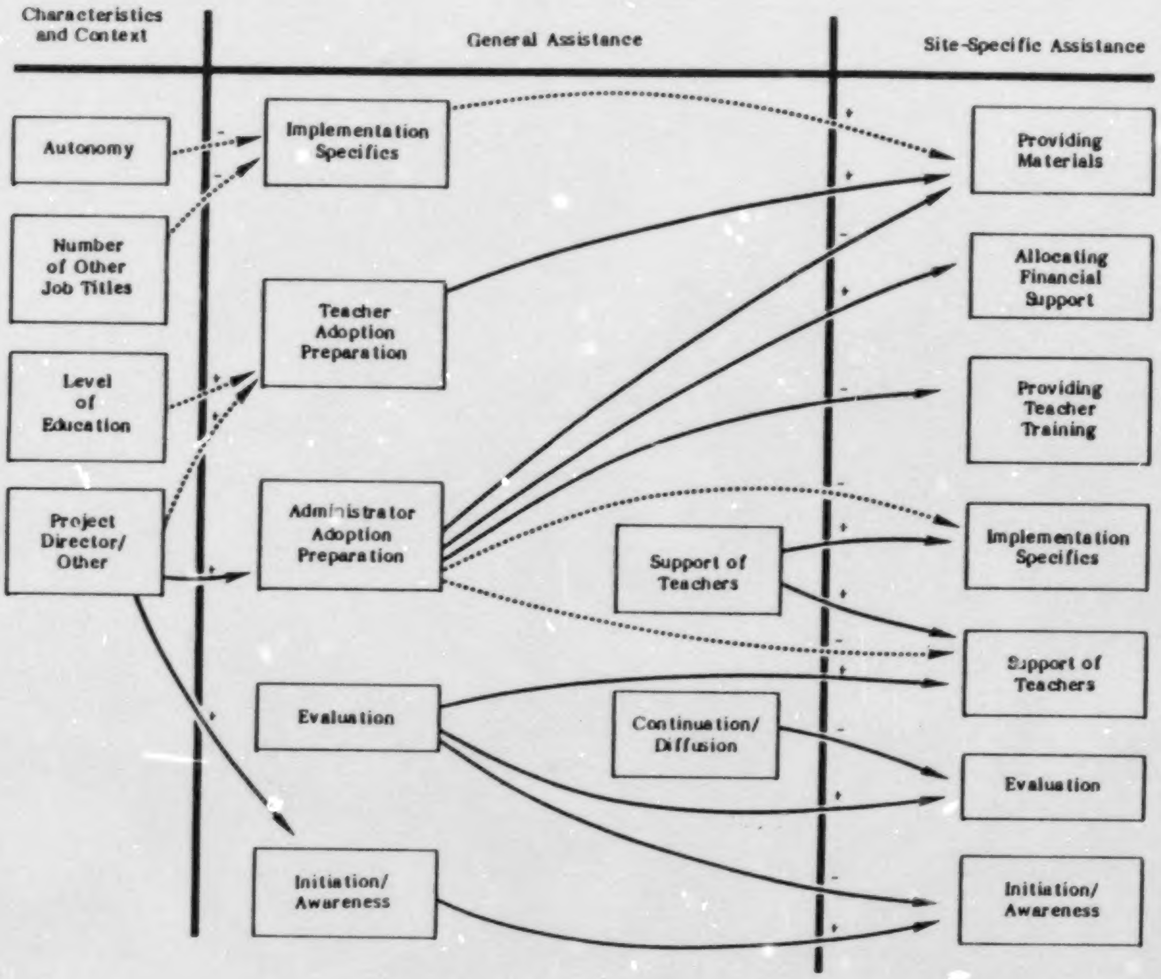

Characteristics and Context
General Assistance
Site-Specific Assistance
Autonomy
Number of Other Job Titles
Level of Education
Project Director/ Other
Implementation Specifics
Teacher Adoption Preparation
Administrator Adoption Preparation
Support of Teachers
Evaluation
Continuation/ Diffusion
Initiation/ Awareness
Providing Materials
Allocating Financial Support
Providing Teacher Training
Implementation Specifics
Support of Teachers
Evaluation
Initiation/ Awareness

Figure 28: Synthesis F: Significant Predictors of External Facilitator Assistance

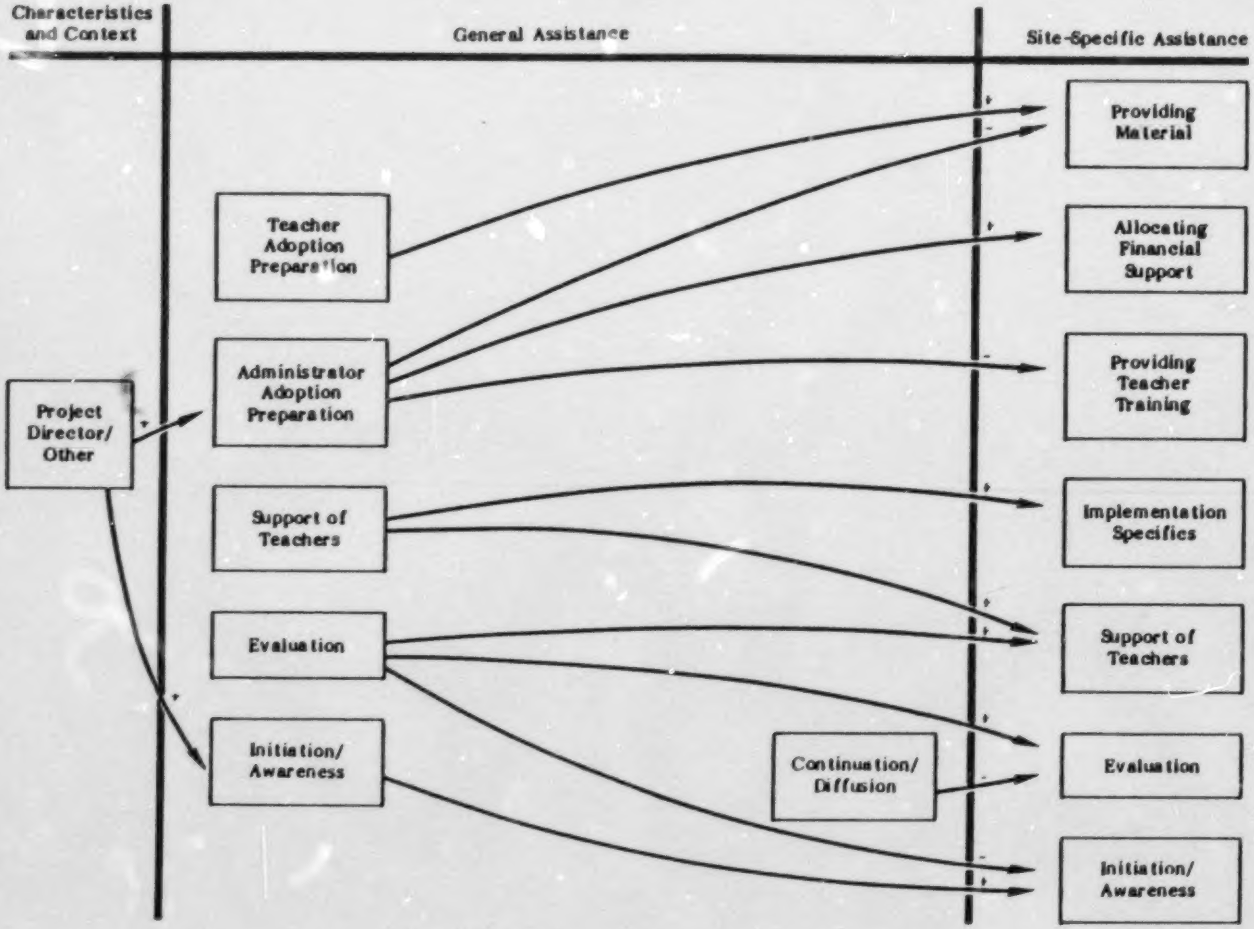
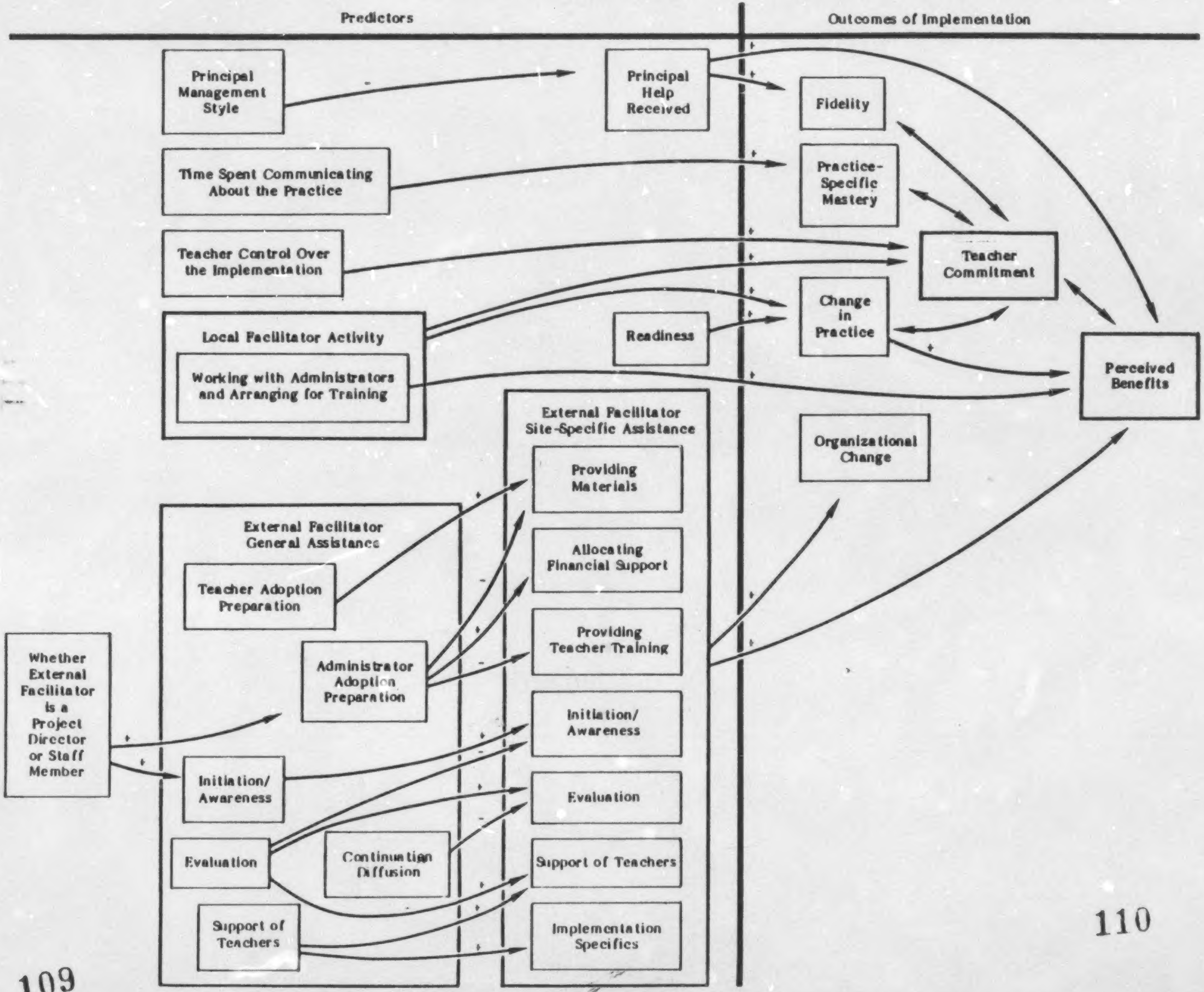

Characteristics and Context
General Assistance
Site-Specific Assistance
Project Director/ Other
Teacher Adoption Preparation
Administrator Adoption Preparation
Support of Teachers
Evaluation
Initiation/ Awareness
Continuation/ Diffusion
Providing Material
Allocating Financial Support
Providing Teacher Training
Implementation Specifics
Support of Teachers
Evaluation
Initiation/ Awareness
+
-
+
-
+
+
+
+
-
-
+

Figure 29: Synthesis G: Summary of Significant Empirical Findings Presented in this Volume


Predictors
Outcomes of Implementation
Principal Management Style
Principal Help Received
Fidelity
Time Spent Communicating About the Practice
Practice-Specific Mastery
Teacher Control Over the Implementation
Teacher Commitment
Local Facilitator Activity
Working with Administrators and Arranging for Training
Readiness
Change in Practice
Perceived Benefits
Organizational Change
External Facilitator Site-Specific Assistance
Providing Materials
Allocating Financial Support
Providing Teacher Training
Initiation/Awareness
Evaluation
Support of Teachers
Implementation Specifics
External Facilitator General Assistance
Teacher Adoption Preparation
Administrator Adoption Preparation
Whether External Facilitator is a Project Director or Staff Member
Initiation/Awareness
Evaluation
Continuation Diffusion
Support of Teachers

CHAPTER VIII: IMPLICATIONS

We begin this chapter by describing sampling information that places limits on the validity of the implications that follow. The remaining five sections present implications respectively for:

- teachers,
- principals,
- administrators,
- facilitators, and
- federal and state policymakers.

Section 1: Limitations on the Validity of the Implications

The validity of the implications we set forth in this chapter is limited by the nature of our sample. First, we only studied factors affecting the implementation of innovations; we did not study factors affecting the adoption of innovations or, for that matter, we did not study factors affecting school improvement strategies that do not involve the implementation of new practices. Second, we restricted our sample to sites that:

- were nominated by a disseminator (or in the case of the Title IV-C Local Development sites, by someone in the State Department of Education),
- had not only implemented an innovation that required the teacher to do something both different and observable, but also were still using it, and
- had contact persons (identified by our nominators) who were aware of the innovation.

Third, out of 171 qualified sites[6], 21 -- representing 12% -- refused to participate, and an additional 4 -- representing 2% -- were dropped for miscellaneous reasons. We do not know what bias exists because of the loss of about one seventh of our qualified sites.

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[6] From our list of eligible sites, we ultimately drew 270. However, 83 of these either did not meet our criteria or didn't exist. Sixteen additional sites were dropped because their inclusion would have violated other sampling restrictions. This left the 171 sites mentioned in the text.

Fourth, many of the implications are based upon the results obtained from testing our model predicting individual outcomes. However, the results we used to develop these implications were obtained solely from teachers who were confronted with the expectation that they change their instructional practice in major ways.

Finally, most of the remaining implications are based upon the results obtained from testing our model predicting school-level outcomes. However, the results we used to develop these implications were obtained solely from the 82 schools in our sample for which we had complete data sets; this represented only 56% of our sites. We have some indication that the dynamics at these 82 sites were similar to those at the 64 sites with incomplete data sets, but we feel compelled to urge caution.

Section 2: Implications for Teachers

According to our data (and to insights developed by our field researcher colleagues) there are a number of actions teachers can take to increase the likelihood that implementation efforts will be successful. The first is internal, psychological. At the outset, teachers should attempt to achieve what authors and playwrights attempt to create in their audiences: a state of suspended disbelief. In other words, without denying their skepticism, they should commit themselves to *approaching* the adoption or implementation of the practice with an attitude something like:

> There are some things about this that don't make sense to me now, but if I roll up my sleeves and muck around with it, and if I formulate and ask the right questions, I will be able to understand why it was put together this way. It may be hard to learn, but with hard work and appropriate help, I can learn it. Furthermore, there may be some bugs that need to be ironed out, but my colleagues and I are capable of doing that. Since it has worked elsewhere, it will probably work here, once we implement it correctly. Even though it may take me two years to master it, when I do I will be a more competent professional.

Next, they should spend time with the practice, both working with the materials *outside* of class, and trying it out *in* class. While they may profit *some* from working with others, it appears that they need to work through the problems they encounter primarily on their own. If they merely request and receive suggestions from others, they may never fully grasp the fundamental principles that make it work, or at least some of its subtleties.

When components do not appear to make sense, teachers should refrain from modifying any of them until they have put forth a good faith effort to comprehend the initial design. It is one thing to deliberately decide to implement the practice in stages, holding parts of it aside until the basic parts are in place. It is another for teachers to decide, before ever giving it a fair trial, that it ought to be streamlined or adapted to fit their current ways of doing things. Huberman and Miles (1982) found that many early efforts to streamline or adapt practices essentially remove the "active ingredients."

When genuinely stuck, however, teachers should seek help from those who have used the practice successfully, or who have intimate knowledge of it. This could be a colleague or, if there is one available, a local facilitator. Under most circumstances, the principal is not knowledgable enough about the practice to be an appropriate resource. Nevertheless, the principal does have a distinct role to play (See Section 3). What is relevant here is that either in one-to-one sessions, in faculty meetings, or, if necessary, through union representatives, teachers can and should encourage the principal to play that role.

Finally, teachers should remain alert to signs that the practice is making a difference, whether in terms of student outcomes, or of helping them clarify, organize, or monitor what they are doing as educators. If and when they discover any such signs, they should capitalize on their discovery. This can include alerting their colleagues, consciously celebrating, and using the occasion to rededicate themselves to the ongoing struggle to excel at their work. If they do this, then they can actively control the cyclical relationship between teacher commitment and implementation outcomes, rather than passively leaving its operation to chance.

Section 3: Implications for Principals

From our data, it appears that principals should refrain from entangling themselves in the details of the implementation of the practice unless they are the district expert on it. However, they should overtly demonstrate their commitment to the successful implementation of the practice by ensuring:

- that the requisite materials are available,
- that teachers have ready access to personnel either within or outside of the district who have practice-relevant knowledge and experience,
- that the relationship between the practice and the school's top priorities is clear and known to all staff,
- that teachers understand the expectation that all of the practice's components are to be implemented (exceptions being authorized only by designated individuals who have intimate knowledge of the practice),

- that the teachers are provided with time to actually *use* the practice, through help with classroom and school-wide scheduling,

- that teachers, parents, and central administrators are operating under a realistic time perspective and do not feel pressured by premature evaluations (e.g., that the successful implementation of innovations that require teachers to change their current practices in major ways will take two to three years, and possibly longer), and

- that a school-wide environment conducive to ongoing, systematic problem-solving be maintained.

Section 4: Implications for Central Office Administrators

We believe that our data and that of Huberman and Miles support the following proposition:

> The proper role for central office administrators who are not local facilitators is first to understand the process of implementation, especially the factors that predict success on various outcome measures. Then, they should apply this understanding by taking whatever steps are necessary to ensure that each of the other actors involved do that which maximizes the likelihood of success.

Chief among the steps we have in mind are:

- actively involving appropriate external facilitators,

- participating in the identification of appropriate local facilitators, publicly legitimizing their role, and ensuring that they have sufficient released time to prepare for and carry out their responsibilities,

- ensuring that all facilitators coordinate their activities so that all of the necessary functions are performed to the extent needed (see Section 5 below for explanation), and

- ensuring that all the principals who are presiding over schools in which the practice will be implemented understand how they and their teachers can increase the likelihood of favorable outcomes.

Section 5: Implications for Facilitators

Collectively, the facilitators that were involved in the sites we studied played a *traceable* role in producing two of our implementation outcomes (*fidelity* and *institutionalization*), a *substantial* role in producing two more (*perceived benefits* and *plans for continuation*), and a *decisive* role in producing four others (*change in practice*, *the practice as a problem solution*, *teacher commitment*, and *practice-specific mastery*). However, while the roles facilitators play in orchestrating successful implementations are crucial, there are three points that must be kept in mind when basing future actions upon our findings:

- Although our data show that both local and external facilitators were involved in producing some implementation outcomes (*change in practice* and *perceived benefits*), each type of facilitator appeared to pursue a rather unique mission. In particular, local facilitators appeared to focus their talents on inducing teachers to see the practice as a solution to their particular problems by focusing them on how to use it profitably in their own classrooms (local facilitators were uniquely associated with the outcomes *the practice as a problem solution* and *teacher commitment*); external facilitators appeared to concentrate their efforts on inducing teachers to master the components of the practice. (This latter conclusion is based upon two kinds of data. First, compared to local facilitators, external facilitators are uniquely associated with three implementation outcomes: *fidelity*, *practice-specific mastery*, and *organizational change*. Second, two kinds of external facilitator activity were singled out as playing crucial roles in producing these outcomes: *awareness activities and other initial contacts* and *help with implementation specifics.*)

- We did not collect data about the extent to which local facilitators and external facilitators spent time together, either agreeing to divide up the turf or collaborating, but we do know that external facilitators tended to spend more time in sites in which local facilitators either were absent or projected a low profile.

- We want to avoid the "naturalistic fallacy," that is, we want to avoid recommending that because there *is* a division of labor between local and external facilitators, therefore there *ought* to be.

Accordingly, we note that the current division of labor seems appropriate for *typical* situations. That is, since external facilitators usually have more content expertise, it makes sense for them to concentrate on helping teachers achieve fidelity, practice-specific mastery, and the various organizational changes that are associated with the practice. And similarly, since compared to external facilitators, local facilitators are usually better informed about their own system, its staff, and its problems, it makes sense for them to be the ones working on galvanizing the staff, inducing them to think about the problems they are facing, and the ways in which the new practice can help address them.

Nevertheless, sometimes experts are too involved with the details and refinements to help those for whom the practice is new. Furthermore, external facilitators usually cannot spend as much time with local teachers as they may need. Finally, local facilitators who have been given special training may be more expert than those external facilitators who work with several practices (e.g., NDN State Facilitators). Similarly, local facilitators may be too caught up with the system, or may be too much the prophet in their own hometown to be successful at inducing teacher commitment or a problem-solving orientation. In short, what may work in many settings may not be what is best for others.

There are three important implications:

- Both kinds of facilitators perceive the implementation task as a process of working toward the achievement of the ten implementation outcomes listed in Table 8. (We take up the question of whether fidelity is an appropriate implementation objective in Section 6.) Our intent here is to suggest that facilitators need more than just a particular perspective; they also need to develop the requisite skills.

  What kinds of skills will help facilitators produce perceived benefits or the perception that the practice solves real problems? Obviously facilitators cannot work toward these objectives in isolation. There must be real benefits to perceive, and the practice has to be making a noticeable dent in problems the teachers recognize and consider important. So in the beginning achieving other outcomes takes precedence. But even at the beginning, important groundwork must be laid. For example, with respect to the problem solution outcome, the facilitator should help teachers identify the kinds of problems they are having that the practice might help them solve.

  But the direct answer to our rhetorical question is that facilitators need skills related to helping teachers reflect upon their experience. These include inducing teachers to thing about and discuss their answers to such questions as why is this activity part of the practice? What would happen if I left it out? How have my students reacted when I tried to use it? Has the practice helped me in the way that I had hoped? Has it made a difference in other aspects of my teaching?

  We did not discuss what facilitators might do to work toward the achievement of the other outcomes. That is because the other outcomes are more straightforward. However, we should add that our data imply that three kinds of activity have special payoff: appropriate groundwork with administrators (including the arranging of training), awareness activities and other initial contacts with teachers, and work on the specifics of implementation. Put another way, facilitators should perform the "in the trenches" assistance tasks of assessing needs, developing school-level support and commitment, conducting training, and providing follow-up.

- Local and external facilitators should collaboratively work out an ad hoc division of labor. Some people believe that the best way to get toothpaste out of a tube is to start at one end using a careful, systematic, cyclical squeeze-and-roll process. Others feel better when they plunge their thumb into the middle of a virgin section of the tube. It is our position that the important issue is whether whatever process that is used eventually gets all the toothpaste out of the tube. Similarly, we believe that local and external facilitators should meet to discuss their strengths, weaknesses, and preferences, and work out an arrangement that ensures that progess can be made on all fronts.

- The facilitators should locate and involve a central office administrator committed to the successful implementation of the practice to bless and coordinate their division-of-labor agreement. Of course a central office administrator may not only have initiated the district's involvement with the practice, but may also have recruited the various facilitators. If so, fine; he or she may take on the blessing-and-coordinating responsibility on his or her own initiative. If not, then the facilitators should determine who should assume this responsibility, and act on their decision. Since most local facilitators are, in fact, central office administrators, this step may not be necessary, but it is worth mentioning for the situations in which, for example, the local facilitator is a teacher in another building.

Section 6: Implications for Federal and State Policymakers

The Study of Dissemination Efforts Supporting School Improvement was funded to answer one superordinate question:

> What steps can the government take to encourage schools to try out new practices and materials that will maximize the amount of school improvement that results?

In this final section, we address four aspects of this question:

- To what kind of school improvement should policymakers assign highest priority?

- Which school improvement strategy should policymakers support: the local development of practices or the dissemination of practices developed elsewhere?

- Should policymakers insist that districts replicate innovations faithfully or encourage districts to adapt innovations to local conditions? and

- How should policymakers allocate funds to maximize the ratio of benefits to costs?

To What Kind of School Improvement Should Policymakers Assign Highest Priority?

While we are not prepared to answer this question *qualitatively*, we are ready to answer it *quantitatively*. In particular, we recommend that policymakers assign highest priority to *major* changes. Our recommendation rests on two different data sets. First, we discovered that the implementation process is predictable -- and therefore *effectively subject to influence* -- only when the amount of change sought exceeds a reasonably large minimum.

Second, in our field study, Huberman and Miles found support for the old adage: "Nothing ventured, nothing gained." Before conducting the study, there was a question in our minds as to whether making a rather small change might magically result in a rather substantial benefit. But in our field study we examined two different kinds of sites that made small changes:

- those that chose to implement practices that were rather similar to what teachers were already doing, and
- those that started out to adopt practices that were rather different from what teachers were already doing but that allowed the teachers *before implementation* to alter the practice to the extent that it only represented a rather modest departure from their prior practice.

In both kinds of sites, the benefits obtained were few and not worth very much.

Thus it is our recommendation that policymakers assign highest priority to helping schools that are willing to try making *major* changes.

Which Strategy of School Improvement Should Policymakers Support: The Local Development of Practices or the Dissemination of Practices Developed Elsewhere?

We tested our model predicting individual-level outcomes on three overlapping samples, two of which are relevant here:

- one that included *only* districts that implemented practices developed elsewhere, and
- one that included not only districts that implemented practices developed elsewhere, but also these developed locally. (Note that we found that few of the teachers in our Title IV-C Local Development sites had been directly involved in the practice's development.)

The major difference between results of both tests was that the latter sample yielded more statistically significant results (which is to be expected given that it contained 34% more teachers -- See Table 3). In general, though, the paths to the implementation outcomes we studied appeared to be the same in both samples. From this finding, we concluded that the implementation process in districts that implement locally developed practices is the same as that in districts that implement practices developed elsewhere. This conclusion was supported by our field study with an interesting variation: there *some* of the locally developed practices had not been adequately debugged prior to implementation, and when this was the case, the implementation was less successful.

What do these findings imply regarding the question at hand? First, they do not provide us with a basis for choosing between dissemination and local development. But they do provide us with a basis for asserting that the initial question should be reframed. Given that our survey and field study found evidence both that districts can develop practices that produce valued benefits, and that practices developed elsewhere can be implemented successfully, we can draw several conclusions:

- Encouraging development is justified.
- The decision regarding *how much* development to encourage depends upon the quantity and quality of the repertoire of practices available to meet policy goals.
- Disseminating validated practices is an effective way to bring about school improvement.
- Therefore, the question that warrants attention is not whether development of dissemination should receive priority, but rather, *How should dissemination be related to development*?

On the basis of what we have said above, it is our position that development, validation, and dissemination should be conducted *independently*. More specifically, we counsel *against* providing money to laboratories, centers, or school districts to *both develop and disseminate* a given practice. Instead we support the notion of *separate* programs or activities:

- those that encourage the development of practices that respond to designated areas of need (e.g., the various federally funded demonstration programs, including Title IV-C Local Development Grants),
- those that validate that the practice has been responsible for successful outcomes (e.g., the Joint Dissemination Review Panel or the state-level equivalents), and
- those that disseminate validated practices (e.g., the National Diffusion Network and the dissemination programs conducted by some states using ESEA Title IV-C funds).

Should Policymakers Insist that Districts Replicate Innovations Faithfully or Encourage Them to Adapt Innovations to Local Conditions?

The sponsors of this study were explicitly interested in gathering data that would bear on the validity of the assumption that the more faithful a validated practice was replicated, the greater the likelihood that the potential of the practice will be realized in the new site. We begin our discussion with a number of observations.

First, the site-level correlation[7] between *fidelity* and *practice-specific mastery* is both high (.66) and highly significant ($p < .01$). Second, the site-level correlations between *fidelity* and both *practice-related mastery* and *change in practice* are small, but positive (each is .24) and significant ($p < .05$). In plain English this means that the closer a site came to implementing a replication of the developer's ideal, the more we were likely to find that the practice implemented:

- represented a substantial change from what the site had been doing prior to implementation,

- was carried out skillfully *from the developer's perspective*, and

- was carried out skillfully *on its own terms*.

Since we believe that substantial improvement cannot occur without substantial change, and that practices work best when they are carried out skillfully regardless of the perspective from which skillfulness is judged (within reason), we take the above results to be a vote for replicating practices faithfully.

Second, as we indicated in Chapter VII, working toward *fidelity* appears to play a central role in a complicated dynamic involving the development of *teacher commitment* that yields favorable ratings on several implementation outcome measures.

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[7] By site-level correlations, we mean that rather than correlating the fidelity scores of *individuals* with other *individual scores*, we assigned each *site* a fidelity score as well as a score on the other implementation outcomes. Then these *site-level* scores were intercorrelated. The site-level correlations reported above are based upon data from 64 sites.

And third, our field study found instances in which administrators, in order to convince teachers to try out the practice, struck a bargain: in return for the teachers trying out the practice, the administrators permitted the teachers to modify the practice. Apparently, it was not unusual for the teachers to eliminate or radically alter those components that were not only most different from what they felt comfortable doing, but also most central to what made the practice qualify as an educational improvement.

Further, we found that if the practices being implemented were educationally sound, if administrators insisted that they be implemented faithfully, and if administrators also provided teachers with the requisite support to achieve fidelity, the implementation was successful according to other outcome measures.

How can the above be reconciled with the oft-reported Rand Corporation finding (Berman & McLaughlin, 1975) that implementation efforts were most successful when "mutual adaptation" occurred (i.e., that teachers changed what they were doing, but in the process the practice being implemented also became transformed)? Part of the answer lies in the fact that the Rand study only looked at locally developed projects, many of which were still in the early stages of development. We suspect also that many of these innovations were implemented in schools within the district before they had been adequately debugged. To the extent that our hunch is on-target -- and the shortness of the development time provides a basis for believing that it is -- then most of the instances studied by Rand violated the first condition noted above (i.e., educational soundness). In short, then, we find that the Rand data is not inconsistent with ours.

What, then, is our recommendation with respect to fidelity? It has four components:

- Before pressuring schools to replicate a practice faithfully, ensure that it is educationally sound. By "educationally sound," we mean not only that the practice has produced convincing effectiveness data (although we deem such data to be essential), but also that the practice has theoretical underpinnings and logical coherence.

- Concentrate responsibility to make modifications in the practice in one individual per district. The responsibility ought to be delegated to someone who is familiar enough with the practice to make sound judgments regarding whether a particular proposed modification is likely to materially reduce the practice's effectiveness.

- Decision-makers considering proposals to modify the practice should consider not only the practice's effectiveness but also the process of practice-mastery. It is important to distinguish among (a) modifying the goal of faithful replication, (b) temporarily accepting a simplified version of the practice for purposes of building competency, and (c) authorizing those modifications that can be construed to be refinements.

To us, it makes sense to stress at the outset the indivisibility and integrity of the practice in its ultimate form. At the same time, however, we counsel allowing experimentation with approximations while teachers are first learning about its nature and operation. Deviations from the developer's version during the competency-building phase are necessitated by the difficulty of mastering multiple components simultaneously. But when teachers have mastered their idiosyncratic approximations of the developer's version, we hold that they should be expected to work toward progressively removing the remaining discrepancies. However, when teachers have achieved what Hall and Loucks (1977), have called "routine" use of the developer's version, we believe they should be authorized to work at their own pace toward "refinement," "integration," and "renewal", which necessarily involve modifying the practice.

- Decision-makers should treat proposals to modify the practice as educational opportunities. If decision-makers merely approve or disapprove such proposals, not only will they incur resentment, but also they will forfeit the opportunity to help teachers identify their current conceptions of and concerns related to the practice. Once this has been done, the decision-maker can address the concerns, correct misconceptions, and help the teachers grasp the practice more fully.

How Should Policymakers Allocate Funds to Maximize the Ratio of Benefits to Costs?

Factors that influence the school improvement process can be divided into four categories:

- those like number of teachers in the building that are impossible for federal or state officials to influence except through screening which districts receive assistance or funds;

- those like principal management style that are possible to influence, at least on a local level, though doing so requires much time, many resources, and skillful politics, and even then the outcome is still highly uncertain;

- those like local facilitator assistance that are somewhat susceptible to federal or state influence and that can be applied to school improvement efforts with minimal funding or possibly only some rearrangement of current staff assignments; and

- those like external facilitator assistance that are highly susceptible to federal or state influence with rather modest cost per district served.

We believe that the answer to the cost question lies in the last two categories of variables. Further, the only variables that qualify for inclusion in these categories are the macro-variables local facilitator assistance, external facilitator assistance, and the variables that are included under these headings (e.g., external facilitator assistance with implementation specifics). Accordingly, we recommend that funding decisions be shaped by the following considerations:

- Maximum effectiveness is likely to be achieved by "inside-outside teams," that is by external facilitators working together with local facilitators.
- The process of implementing practices that confront teachers with the expectation that they make major changes is sufficiently complex to require that those who play a facilitating role receive either special training and/or on-going technical assistance.
- Implementing such practices requires substantial assistance at the outset and progressively less as teachers become increasingly skillful.
- Nevertheless, it usually takes two or three years after teachers begin experimenting with a new practice before they get beyond using the developer's version in a routine manner (and move to the refinement, integration, and renewal stages).
- Finally, because districts usually (and wisely) proceed somewhat cautiously -- by starting implementation in one or a few schools and then, if it seems to be working out, moving to diffuse the practice to most of the remaining eligible teachers -- full, district-wide implementation is at least a five-year process.

Accordingly, we offer the following recommendations:

- Some funds should be allocated to external facilitators, both those who thoroughly understand the classroom use of a particular validated practice, and those who know about the existence of many practices and are skilled at assisting others to carry out the implementation process regardless of the specific practice involved.
- Small adoption grants should be given to local districts to release existing staff to become temporary local facilitators.

- Funding should be structured so that implementing districts receive external assistance and funds in decreasing amounts over a five-year period.

- Federal policymakers should fund the development of one or more model programs for preparing educational facilitators that could be incorporated into either university curricula or academies such as those sponsored by some school districts, state departments, or intermediate agencies. We have in mind a program that would be broad enough to be relevant to individuals currently in or aspiring to a range of positions, from associate superintendent for curriculum and instruction, to NDN State Facilitator, to ECIA Chapter I Coordinator. Concurrently, or independently if necessary, state policymakers should broaden their requirements for certification in educational administration so that principals and central office administrators will develop competencies related to fostering educational change in general, and implementing new practices in particular.

Section 7: Conclusion

Our survey indicated that encouraging schools to try new practices and materials is a viable strategy. On the basis of data from our survey and our longitudinal field study, we have derived a number of implications for teachers, principals, central office administrators, facilitators, and policymakers. What has worked some of the time can work more often. Similarly, what has fallen short of its promise can come closer. Now more is known. But for it to be of use, it must be applied.

Appendix A: Regression Coefficients, Standard Errors, and Levels of Significance for Factors Predicting Perceived Benefits -- All-Programs Major Required Change Sample

Individual Level Variables (N = 83 teachers 48 schools) $p < .01$ $R^2 = .42$	$\hat{\beta}$	SE	p
Change in Practice	.10	.05	$< .05$
Teacher Commitment	- .34	.28	N.S.
Staff Help For Individuals	.007	.05	N.S.
Principal Help Received	.31	.15	$< .05$
Elapsed Time	- .001	.0009	N.S.
Outside Help for Individuals	.70	.26	$< .05$

Appendix A (Continued)

Site Level Variables (N = 31 schools) $p < .44$ $R^2 = .37$	$\hat{\beta}$	SE	p
Implementation Requirements	- .14	.39	N.S.
Prescriptiveness	- .03	.55	N.S.
Readiness	.20	1.29	N.S.
Additional Staff for Practice	- .77	1.31	N.S.
Outside Help Reported By Principal	.12	.45	N.S.
Central Office Help	- .45	.33	N.S.
Principal Help Given	- .20	.42	N.S.
External Facilitator Help	- .04	.04	N.S.
Local Facilitator Help	.04	.02	<.05

Appendix B: Regression Coefficients, Standard Errors, and Levels of Significance for Factors Predicting Change in Practice -- All-Programs Major Required Change Sample

Individual Level Variables (N = 83 teachers 48 schools) $p < .04$ $R^2 = .49$	$\hat{\beta}$	SE	p
Teacher Commitment	-1.04	.98	N.S.
Staff Help For Individuals	.22	.19	N.S.
Principal Help Received	.65	.49	N.S.
Elapsed Time	.003	.003	N.S.
Outside Help for Individuals	.21	.95	N.S.
Time Spent on Classroom Use	1.27	.664	N.S.
Time Spent on Materials	- .68	.77	$p < .10$
Time Spent on Training	- .24	.68	N.S.
Time Spent on Evaluating	.17	1.66	N.S.
Time Spent on Communicating	1.68	.85	N.S.

Appendix B (continued)

Site Level Variables (N = 31 schools) $p < .33$ $R^2 = .41$	$\hat{\beta}$	SE	p
Implementation Requirements	2.91	2.52	N.S.
Prescriptiveness	-5.34	3.3	$<.100$
Readiness	16.34	7.01	$<.05$
Additional Staff for Practice	-2.15	6.13	N.S.
Outside Help Reported By Principal	.52	2.38	N.S.
Central Office Help	- .59	1.48	N.S.
Principal Help Given	- .97	2.26	N.S.
External Facilitator Help	- .36	.18	$<.05$
Local Facilitator Help	.26	.13	$<.05$

Appendix C: Regression Coefficients, Standard Errors, and Levels of Significance for Factors Predicting Practice-Specific Mastery -- All-Programs Major Required Change Sample

Individual Level Variables (N = 83 teac[illegible]rs 48 sch[illegible]s) $p < .04$ R2 = .50	$\hat{\beta}$	SE	p
Teacher Commitment	- .22	.21	N.S.
Staff Help For Individuals	.06	.04	N.S.
Principal Help Received	.11	.10	N.S.
Elapsed Time	- .0003	.0007	N.S.
Outside Help for Individuals	- .07	.20	N.S.
Time Spent on Classroom Use	.22	.14	N.S.
Time Spent on Materials	.30	.16	$< .10$
Time Spent on Training	- .003	.14	N.S.
Time Spent on Evaluating	- .32	.35	N.S.
Time Spent on Communicating	.38	.18	$< .05$

Appendix C (Continued)

Site Level Variables (N = 31 schools) $p < .62$ $R2 = .31$	$\hat{\beta}$	SE	p
Implementation Requirements	.75	.93	N.S.
Prescriptiveness	-1.54	1.22	N.S.
Readiness	3.55	2.58	N.S.
Additional Staff for Practice	-1.13	2.26	N.S.
Outside Help Reported By Principal	.32	.87	N.S.
Central Office Help	- .67	.55	N.S.
Principal Help Given	- .39	.83	N.S.
External Facilitator Help	.02	.07	N.S.
Local Facilitator Help	.06	.05	N.S.

Appendix D: Regression Coefficients, Standard Errors, and Levels of Significance for Factors Predicting Fidelity -- All-Programs Major Required Change Sample

Individual Level Variables (N = 83 teachers 48 schools) $p < .02$ $R^2 = .53$	$\hat{\beta}$	SE	p
Teacher Commitment	- .39	.85	N.S.
Staff Help For Individuals	.08	.17	N.S.
Principal Help Received	1.28	.43	$p < .05$
Elapsed Time	- .001	.003	N.S.
Outside Help for Individuals	- .02	.83	N.S.
Time Spent on Classroom Use	.94	.58	$p < .05$
Time Spent on Materials	- .007	.68	N.S.
Time Spent on Training	.45	.60	N.S.
Time Spent on Evaluating	- .51	1.45	N.S.
Time Spent on Communicating	.58	.74	N.S.

Appendix D (Continued)

Site Level Variables (N = 31 schools) $p<.97$ $R2 = .14$	$\hat{\beta}$	SE	p
Implementation Requirements	1.62	4.05	N.S.
Prescriptiveness	-4.79	5.33	N.S.
Readiness	10.97	11.24	N.S.
Additional Staff for Practice	2.18	9.85	N.S.
Outside Help Reported By Principal	-2.32	3.80	N.S.
Principal Help Given	.63	3.62	N.S.
Local Facilitator Help	.08	.21	N.S.
External Facilitator Help	- .36	.29	N.S.
Central Office Help	-1.47	2.38	N.S.

Appendix E: Regression Coefficients, Standard Errors, and Levels of Significance for Factors Predicting Perceived Benefits -- All-Programs Minor Required Change Sample

Individual Level Variables (N = 78 teachers 56 schools) $p < .41$ $R^2 = 51$	$\hat{\beta}$	SE	p
Change In Practice	.02	.08	N.S.
Teacher Commitment	.22	.38	N.S.
Staff Help for Individuals	-.14	.16	N.S.
Elapsed Time	.001	.001	N.S.
Principal Help Received	.20	.16	N.S.
Outside Help for Individuals	-.35	.25	N.S.
Time Spent on Classroom Use	.19	.27	N.S.
Time Spent on Training	.43	.24	$p < .10$
Time Spent on Evaluating	.04	.52	N.S.
Time Spent on Materials	-.16	.22	N.S.
Time Spent on Communicating	-.29	.44	N.S.

Appendix E (Continued)

Site Level Variables (N = 28 Schools) $p < .18$ $R^2 = 10$	$\widehat{\beta}$	SE	p
Implementation Requirements	.38	.28	N.S.
Prescriptiveness	.22	.91	N.S.
Additional Staff for Practice	2.22	3.51	N.S.
Outside Help Reported by Principal	-.65	.80	N.S.
Readiness	-.40	3.07	N.S.
Central Office Help	.47	.58	N.S.
Principal Help Given	.46	.53	N.S.
External Facilitator Help	.02	.06	N.S.
Local Facilitator Help	.05	.11	N.S.

Appendix F: Regression Coefficients, Standard Errors, and Levels of Significance for Factors Predicting Change in Practice -- All-Programs Minor Required Change Sample

Individual Level Variables (N = 78 teachers 56 schools) $p < .16$ $R^2 = .58$	$\hat{\beta}$	SE	p
Teacher Commitment	1.52	.91	<.10
Staff Help for Individuals	- .17	.21	N.S.
Principal Help Received	.26	.38	N.S.
Elapsed Time	.006	.003	N.S.
Outside Help for Individuals	-1.08	.63	<.10

Appendix F (Continued)

Site Level Variables (N = 28 schools) $p < .71$ $R^2 = .32$	$\hat{\beta}$	SE	p
Implementation Requirements	- .38	1.32	N.S.
Prescriptiveness	- .78	.66	N.S.
Readiness	-4.87	3.99	N.S
Principal Help Given	.51	.91	N.S.
Outside Help Reported by Principal	.71	.94	N.S.
Additional Staff for Practice	-1.33	3.2	N.S.
Central Office Help	- .57	1.21	N.S.
Local Facilitator Help	.08	.08	N.S.
External Facilitator Help	.09	.09	N.S.

Appendix G: Regression Coefficients, Standard Errors, and Levels of Significance for Factors Predicting Practice-Specific Mastery -- All-Programs Minor Required Change Sample

Individual Level Variables (N = 78 teachers 56 schools) $p < .90$ $R^2 = .08$	$\hat{\beta}$	SE	p
Teacher Commitment	.06	.41	N.S.
Staff Help for Individuals	.05	.09	N.S.
Principal Help Received	.17	.17	N.S.
Elapsed Time	.0006	.001	N.S.
Outside Help for Individuals	- .16	.28	N.S.

Appendix G (Continued)

Site Level Variables (N = 28 schools) $p < .75$ $R^2 = .30$	$\hat{\beta}$	SE	p
Implementation Requirements	- .35	.51	N.S.
Prescriptiveness	- .42	.63	N.S.
Readiness	-2.57	1.52	N.S.
Principal Help Given			
Outside Help Reported by Principal	.14	.35	N.S.
Additional Staff for Practice	.02	1.22	N.S.
Central Office Help	- .19	.46	N.S.
Local Facilitator Help	- .008	.03	N.S.
External Facilitator Help	.03	.04	N.S.

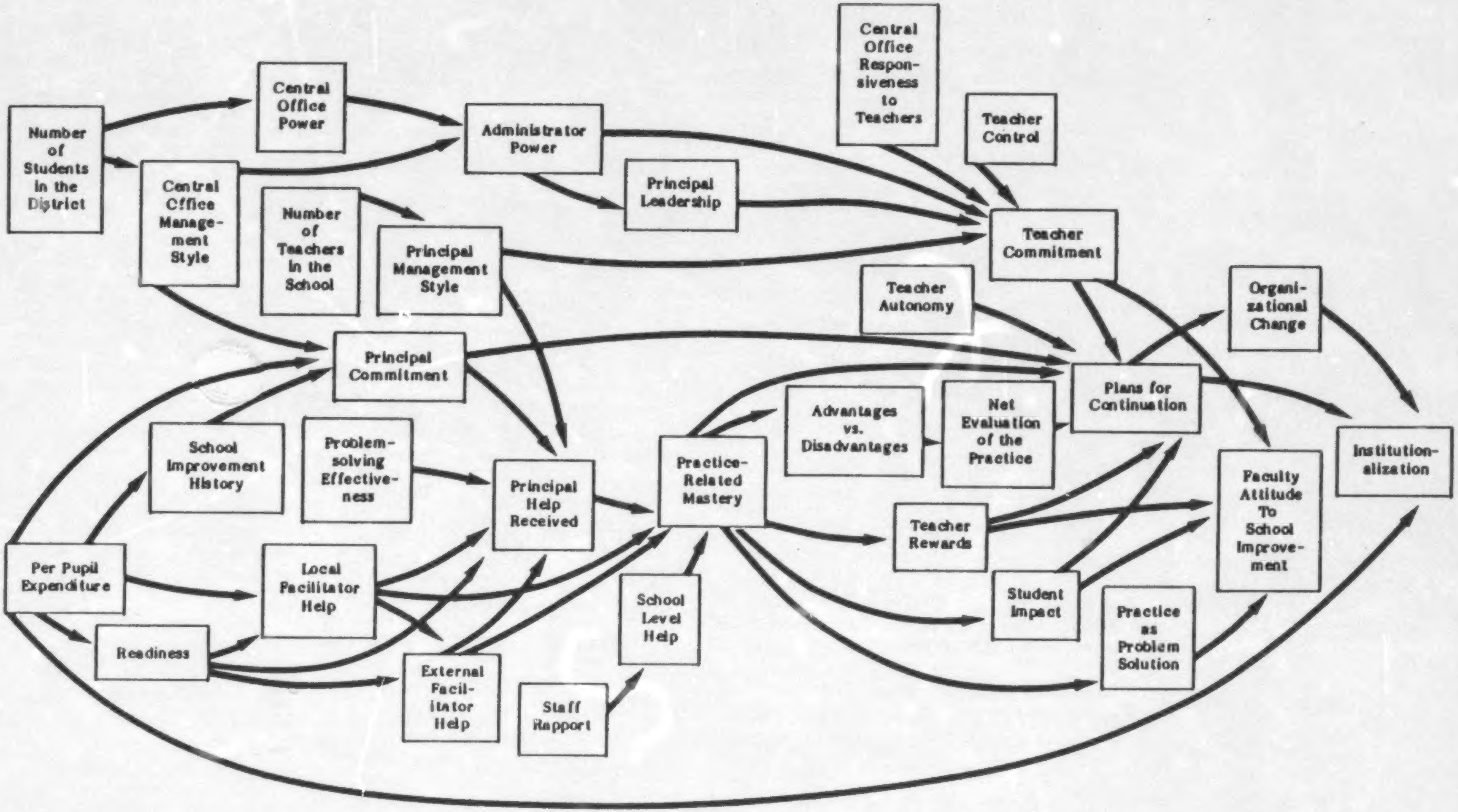
Appendix H: Regression Coefficients, Standard Errors, and Levels of Significance for Factors Predicting Fidelity -- All-Programs Minor Required Change Sample

Individual Level Variables (N = 78 teachers 56 schools) $p < .58$ $R^2 = .18$	$\hat{\beta}$	SE	p
Teacher Commitment	.43	.66	N.S.
Staff Help for Individuals	- .12	.15	N.S.
Principal Help Received	.27	.27	N.S.
Elapsed Time	.001	.002	N.S.
Outside Help for Individuals	.10	.46	N.S.

Appendix H (Continued)

Site Level Variables (N = 28 schools) $p < .67$ $R2 = .33$	$\hat{\beta}$	SE	p
Implementation Requirements	- .81	1.16	N.S.
Prescriptiveness	-1.91	1.45	N.S.
Readiness	-3.25	3.49	N.S.
Principal Help Given	- .41	.79	N.S.
Outside Help Reported by Principal	1.13	.82	N.S.
Additional Staff for Practice	- .52	2.80	N.S.
Central Office Help	- .85	1.06	N.S.
Local Facilitator Help	.02	.07	N.S.
External Facilitator Help	.11	.09	N.S.

Appendix I: Detailed Version of the Initial Model Predicting School-Level Outcomes


Number of Students in the District
Central Office Power
Administrator Power
Central Office Management Style
Principal Leadership
Central Office Responsiveness to Teachers
Teacher Control
Number of Teachers in the School
Principal Management Style
Teacher Commitment
Teacher Autonomy
Organizational Change
Principal Commitment
Plans for Continuation
Advantages vs. Disadvantages
Net Evaluation of the Practice
Institutionalization
School Improvement History
Problem-solving Effectiveness
Principal Help Received
Practice-Related Mastery
Faculty Attitude To School Improvement
Teacher Rewards
Per Pupil Expenditure
Local Facilitator Help
Student Impact
School Level Help
Practice as Problem Solution
Readiness
External Facilitator Help
Staff Rapport

Appendix J: Regression Coefficients, Standard Errors and Levels of Significance for Factors in the Initial Model Predicting School-Level Outcomes

Predictors of Institutionalization

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Organizational Change	.5319	.3818	N.S.
Plans for Continuation	.1433	.5273	N.S.
Practice-Related Mastery	.2076	.2873	N.S.
Central Office Responsiveness to Teachers	.4549	.7191	N.S.
Per Pupil Expenditure	.0188	.0273	N.S.

Predictors of Organizational Change

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Plans for Continuation	.2257	.2194	N.S.

Predictors of Faculty Attitude Toward School Improvement

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Plans for Continuation	.2404	.1570	N.S.
Teacher Commitment to the Practice	.0832	.1013	N.S.
Practice as a Problem Solution	-.7222	.4309	$p < .10$
Teacher Rewards	.0191	.1712	N.S.
Student Impact	-.1570	.0884	$p < .10$

Appendix J (Continued)

Predictors of Plans for Continuation

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Teacher Rewards	.2524	.1656	N.S.
Net Evaluation of the Practice	.0319	.0341	N.S.
Student Impact	.0716	.0880	N.S.
Practice-Related Mastery	.0612	.0884	N.S.
Teacher Commitment	- .1960	.1001	N.S.
Teacher Autonomy	.0472	.1092	N.S.
Principal Commitment	.1257	.1017	N.S.
Principal Leadership	- .0910	.1792	N.S.

Predictors of Practice as a Problem Solution

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Advantages vs. Disadvantages	- .5418	.3889	N.S.

Predictors of Teacher Rewards

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Practice-Related Mastery	.0508	.0813	N.S.

Predictors of Net Evaluation of the Practice

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Advantages vs. Disadvantages	-2.2697	1.1624	N.S.

Appendix J (Continued)

Predictors of Advantages versus Disadvantages

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Practice-Related Mastery	-.0837	.0526	p <.10

Predictors of Student Impact

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Practice-Related Mastery	-.1639	.1531	N.S.

Predictors of Practice-Related Mastery

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Principal Help Received	.0652	.0377	p <.10
School-Level Help	-.0067	.0319	N.S.
Local Facilitator Help	-.0049	.0075	N.S.
External Facilitator Help	.0164	.0103	N.S.

Predictors of Teacher Commitment to the Practice

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Teacher Control Over Implementation	.8298	.2253	p <.05
Principal Management Style	-.0075	.0778	N.S.
Administrative Power Over Implementation	.1050	.1907	N.S.
Central Office Responsiveness to Teachers	.2152	.1587	N.S.

Appendix J (Continued)

Predictors of Teacher Control Over Implementation

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Principal Management Style	.0166	.0559	N.S.

Predictors of Principal Help Received

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Principal Commitment	.9849	.6047	$p < .10$
Principal Management Style	-1.5392	.3446	$p < .05$
Problem-Solving Effectiveness	1.1759	.4302	$p < .05$
Readiness	1.1843	1.3288	N.S.
Local Facilitator Help	.1191	.1745	N.S.
External Facilitator Help	.0051	.0340	N.S.

Predictors of Principal Commitment to the Practice

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Central Office Management Style	.0043	.0611	N.S.
Per Pupil Expenditure	- .0059	.0126	N.S.
School Improvement History	.1022	.1861	N.S.

Appendix J (Continued)

Predictors of Principal Leadership

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Administrator Power Over Implementation	.2552	.1676	p<.10

Predictors of Principal Management Style

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Number of Teachers in the School	.0232	.0079	

Predictors of School-Level Help

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Problem Solving Effectiveness	- .3798	1.2326	N.S.
Staff Rapport	- .3787	.6703	N.S.

Predictors of Local Facilitator Help

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Readiness	5.9056	8.6525	N.S.
Per Pupil Expenditure	.2635	.3080	N.S.
External Facilitator Help	.0638	.2204	N.S.

Appendix J (Continued)

Predictors of External Facilitator Help

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Readiness	5.6823	6.2717	N.S.

Predictors of Readiness

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Per Pupil Expenditure	- .0036	.0058	N.S.

Predictors of Administrator Power Over Implementation

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Central Office Responsiveness to Teachers	.1602	.2484	N.S.
Central Office Management Style	- .0055	.0457	N.S.

Predictors of Central Office Power

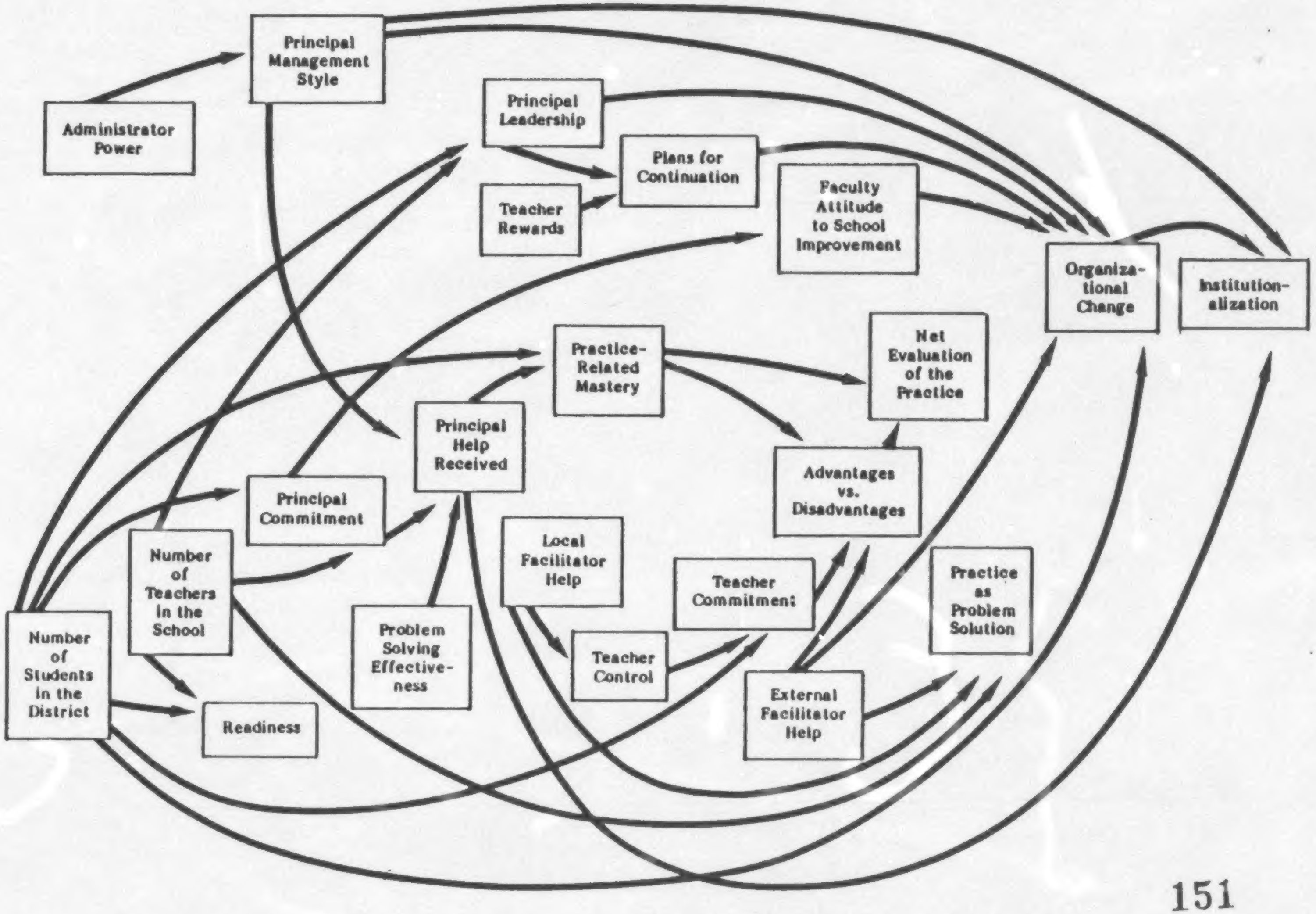
Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Number of Students in the District	.0009	.0010	N.S.

Appendix J (Continued)

Predictors of School Improvement History

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Per Pupil Expenditure	-.0048	.0110	N.S.

Appendix K: Detailed Version of the Revised Model Predicting School-Level Outcomes


Principal Management Style
Administrator Power
Principal Leadership
Plans for Continuation
Teacher Rewards
Faculty Attitude to School Improvement
Organizational Change
Institutionalization
Practice-Related Mastery
Net Evaluation of the Practice
Principal Help Received
Advantages vs. Disadvantages
Principal Commitment
Number of Teachers in the School
Local Facilitator Help
Teacher Commitment
Practice as Problem Solution
Number of Students in the District
Problem Solving Effectiveness
Teacher Control
External Facilitator Help
Readiness

Appendix L: Regression Coefficients, Standard Errors, and Levels of Significance for Factors in the Revised Model Predicting School-Level Outcomes

N = 82 ^{2} 159 = 254.715 $p < .001$

Predictors of Institutionalization

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Organizational Change	.7025	.3775	$p < .10$
Principal Help Received	.0986	.0849	N.S.
Principal Management Style	-.1390	.2102	N.S.

Predictors of Organizational Change

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Plans for Continuation	.2258	.1845	N.S.
Faculty Attitude Toward School Improvement	-.3739	.1781	$p < .05$
Principal Leadership	.2710	.1583	$p < .10$
Principal Management Style	.0365	.0704	N.S.
Number of Students in the District	-.0004	.0004	N.S.
External Facilitator Help	.0183	.0067	$p < .05$

Predictors of Plans for Continuation

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Teacher Rewards	-.2475	.1621	$p < .05$
Principal Commitment	.1601	.1015	$p < .10$
Principal Leadership	.2321	.1276	$p < .10$

Appendix L (Continued)

Predictors of Practice as a Problem Solution

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Local Facilitator Help	.0029	.0015	$p < .10$
Number of Teachers in the School	- .0010	.0011	N.S.
External Facilitator Help	.0026	.0020	N.S.

Predictors of Net Evaluation of the Practice

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Practice-Related Mastery	.5418	.3675	N.S.
Advantages vs. Disadvantages	-2.2697	1.1514	$p < .05$

Predictors of Advantages versus Disadvantages

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Practice-Related Mastery	- .0721	.0419	$p < .10$
Teacher Commitment	- .2382	.0538	$p < .05$
External Facilitator Help	.0049	.0029	$p < .10$

Predictors of Practice-Related Mastery

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Principal Help Received	.0736	.0437	$p < .10$
Number of Students in the District	.0037	.0023	$p < .10$

Appendix L (Continued)

Predictors of Teacher Commitment to the Practice

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Teacher Control Over Implementation	.7846	.2095	$p < .05$
Local Facilitator Help	.0136	.0053	$p < .05$
Number of Students in the District	.0030	.0015	$p < .10$

Predictors of Teacher Control Over Implementation

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Local Facilitator Help	- .0063	.0039	N.S.

Predictors of Principal Help Received

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Principal Commitment	1.1005	.6242	$p < .10$
Principal Management Style	-1.5740	.5975	$p < .05$
Problem-Solving Effectiveness	1.1463	.7440	$p < .10$

Predictors of Principal Commitment to the Practice

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Number of Teachers in the School	- .0109	.0045	$p < .05$
Number of Students in the District			$p < .10$

Appendix L (continued)

Predictors of Principal Leadership

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Number of Teachers in the School	.0077	.0035	$p < .05$
Number of Students in the District	-.0027	.0014	$p < .10$

Predictors of Principal Management Style

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Administrative Power Over Implementation	.2186	.1550	N.S.

Predictors of Readiness

Hypothesized Predictors	Regression Coefficient	Standard Error	Level of Significance
Number of Teachers in the School	-.0037	.0002	$p < .10$
Number of Students in the District	.0016	.0090	$p < .10$

Appendix M: Regression Coefficients, Standard Errors, and Levels of Significance for Factors Predicting External Facilitator General Assistance

$F = 1.3887$ $p < .05$

Hypothesized Predictors	Support of Teachers			Implementation Specifics			Teacher Adoption Preparation			Administrator Adoption Preparation			Initiation/ Awareness			Evaluation			Continuation/ Diffusion		
	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p
Product vs. Capacity Orientation	.10	.49	N.S.	.11	.36	N.S.	.47	.41	N.S.	.21	.38	N.S.	.55	.52	N.S.	.07	.27	N.S.	.09	.20	N.S.
Adaptation as Philosophy	1.09	1.11	N.S.	-.61	.82	N.S.	.16	.94	N.S.	.45	.87	N.S.	.33	1.19	N.S.	-.24	.60	N.S.	- .05	.45	N.S.
Local/ Cosmopolitan Orientation	-2.47	1.39	< .10	-.94	1.03	N.S.	-1.37	1.18	N.S.	-2.03	1.09	< .10	-1.39	1.49	N.S.	-.45	.76	N.S.	- .11	.57	N.S.
Project Director/ Other	1.86	1.47	N.S.	.87	1.08	N.S.	2.38	1.24	< .10	2.57	1.15	< .05	4.46	1.57	N.S.	.93	.80	N.S.	.60	.60	N.S.
Number of other Job Titles	- .71	.49	N.S.	-.61	.36	N.S.	.15	.42	< .10	- .29	.39	N.S.	- .44	.53	N.S.	-.22	.27	N.S.	- .04	.20	N.S.
Level of Education	.09	.47	N.S.	-.37	.35	N.S.	.76	.40	< .10	- .09	.37	N.S.	.16	.50	N.S.	.20	.25	N.S.	.24	.19	N.S.
Number of Professional Organizations	.28	.38	N.S.	.05	.28	N.S.	.06	.32	N.S.	.03	.30	N.S.	.58	.40	N.S.	-.19	.21	N.S.	- .17	.15	N.S.
Intolerance of Ambiguity	.46	.53	N.S.	.20	.39	N.S.	.01	.45	N.S.	.32	.41	N.S.	.35	.56	N.S.	.05	.29	N.S.	.42	.22	< .10
Amount of Travel	.05	.06	N.S.	.00	.04	N.S.	.08	.05	N.S.	- .01	.04	N.S.	.06	.06	N.S.	.01	.03	N.S.	- .02	.02	N.S.
Job Satisfaction	.30	.26	N.S.	-.08	.19	N.S.	.24	.22	N.S.	.16	.20	N.S.	.48	.27	< .10	-.02	.14	N.S.	.18	.10	< .10

Appendix H: Regression Coefficients, Standard Errors, and Levels of Significance for Factors Predicting External Facilitator Site-Specific Assistance

F = 2.0465 $p < .0001$

Category of Site-Specific Assistance Predicted

Hypothesized Predictors	Initiation/ Awareness			Support of Teachers			Administrator Adoption Preparation			Teacher Adoption Preparation			Providing Materials			Implementation Specifics			Evaluation			Continuation/ Diffusion			Allocating Funds		
	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p	$\hat{\beta}$	SE	p
Support of Teachers	-.25	.20	N.S.	.38	.13	< .05	.02	.17	N.S.	.19	.13	N.S.	-.03	.10	N.S.	.42	.13	< .05	.12	.12	N.S.	.06	.08	N.S.	-.03	.06	N.S.
Implementation Specifics	.38	.26	N.S.	.10	.17	N.S.	.15	.22	N.S.	.11	.17	N.S.	.24	.13	<.10	.26	.17	N.S.	.13	.16	N.S.	.14	.11	N.S.	-.03	.08	N.S.
Teacher Adoption Preparation	-.20	.19	N.S.	-.06	.13	N.S.	-.09	.17	N.S.	.13	.12	N.S.	.20	.10	<.05	-.15	.13	N.S.	-.05	.12	N.S.	.02	.08	N.S.	-.02	.06	N.S.
Administrator Adoption Preparation	.03	.22	N.S.	-.28	.15	< .10	.16	.19	N.S.	-.32	.14	<.05	-.25	.11	<.05	-.27	.14	< .10	-.19	.14	N.S.	-.15	.09	N.S.	.19	.07	<.05
Initiation/ Awareness	.28	.14	< .05	.05	.09	N.S.	-.08	.12	N.S.	.10	.09	N.S.	.06	.07	N.S.	.03	.09	N.S.	.13	.09	N.S.	-.02	.06	N.S.	-.02	.04	N.S.
Evaluation	-.78	.26	< .05	.45	.18	< .05	-.22	.23	N.S.	-.10	.17	N.S.	-.16	.13	N.S.	.21	.17	N.S.	.57	.17	< .05	.06	.11	N.S.	-.08	.09	N.S.
Continuation/ Diffusion	.56	.35	N.S.	-.37	.23	N.S.	.43	.30	N.S.	.10	.23	N.S.	-.08	.18	N.S.	-.24	.23	N.S.	-.59	.22	< .05	.07	.14	N.S.	.03	.11	N.S.

The NETWORK inc.

290 South Main Street, Andover, Massachusetts [illegible]